Railway Age

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EDITORIAL

Railway Age

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A Suggestion for Traffic Officers

The general manager of a western railway which has recently completed the construction of a line of unusual scenic attractions has adopted a novel expedient to insure that the traffic representatives of foreign lines know of these attractions in sufficient detail to be able to encourage travel over it. It is the practice of many employees of that road to request transportation through the central and eastern states for use on their vacations. As this transportation is delivered to them they are asked to call on traffic representatives and at ticket offices in the communities which they visit and to make inquiry regarding this and other routes to ascertain the familiarity of the traffic representatives with the advantages of their road, without making their identity known. They then report the results of their inquiries to the general manager and these reports are transmitted to the traffic representatives of that road in the territories visited. Where it is found that the employees of foreign lines are not familiar with the attractions of this road, care is taken to see that proper information is placed in their hands at an early date. By enlisting the co-operation of employees in this manner a large amount of information of value to the road is secured. The application of this idea is not confined to the traffic department, but may be applied in a great diversity of ways which will be valuable to the railroad without requiring undue effort on the part of the employee.

Oil Engines for Motive Power

The inherent efficiency of Diesel and semi-Diesel engines makes them desirable for a wide variety of uses. Their application to locomotives and cars has long been a matter of much speculation on the part of traction engineers. Originally the Diesel engine was not dependable; a person not especially skilled and trained could not be depended upon to keep the engine in continuous operation. This difficulty, however, is rapidly being disposed of and there are now fifteen Diesel motorized trains in operation on Swedish lines. The oil-electric locomotive now being used in switching service in New York City on the New York Central, probably presents the most important application of this type of prime mover for traction purposes in this country. One of the disadvantages of the Diesel engine for this kind of service is that it does not idle well. This difficulty is entirely overcome in the case of the oil engine used on the New York Central locomotive, and starting and stopping the engine is a simple operation. Another handicap of the original Diesel engine was its weight, but the engine on the Central locomotive weighs only 56 lb. per horsepower, which leaves a wide margin in which to add such weight as may be necessary for the electrical power transmission equipment. The locomotive is driven by a 300 hp. engine, which is small power for a locomotive, but in this class of service high speeds are not required and the characteristics of the electric drive are such that the full power of the engine can be applied to the rail at any speed. As a result it gives excellent performance as a switching locomotive. Dependability and maintenance charges are factors which will have to be determined, but all indications are that the engine can be relied upon and that the maintenance costs will be small. If larger locomotives are built it will mean that they must be equipped with a larger engine or with more than one engine. This will be a matter of development but apparently presents no unsurmountable difficulties. The locomotive as built conforms with the requirements of general switching practice. Further developments may make it suitable for other classes of service.

Useful Annual Reports

The *Railway Age* has at various times expressed the view that the railways do not as a rule make the most of their opportunity in connection with their annual reports to stockholders. We have pointed out that some of the reports are too perfunctory, or that others, while containing page after page of statistics, present, notwithstanding, little of the real information for which the stockholder is looking. That favorable stockholder relations are desirable surely must be axiomatic. If there is any better way in which such can be secured—outside, of course, of regular dividend checks—than through the annual report, we have not yet heard of it. The trouble in discussing what is good or what is lacking in annual reports lies largely in making the discussion practical. This we propose to do in this paragraph by bringing attention to what the *Railway Age* believes to be one of the best railway annual reports that has come to us this year; namely, that issued recently by the Great Northern. First and foremost to characterize the report is the excellence of the president's remarks. These were apparently written by Mr. Budd himself. In a very nice way he has briefly analyzed some of the more important statistics which are, of course, given in the report in the usual manner. He has then interestingly and briefly discussed some of the important features of Great Northern progress, such as oil development in Montana, immigration and agricultural development, acquisitions of equipment and other capital improvements, group insurance, employee stockholders, etc. The Great Northern has decided to go in for passenger business. There appears in the report a statement about the new Oriental Limited—supplemented, be it noted, by illustrations—that should lead every Great Northern stockholder to hope that he may soon be a passenger on that already famous train. The *Railway Age* has long since pointed out the desirability of showing in the annual report the figure of net operating income and most annual reports now do so. Mr. Budd, however, has shown in his report a detailed statement of net operating income for the three years, 1921, 1922 and 1923. The report unfortunately is issued rather late in the year. This drawback is compensated for in a measure because, on the one hand, Great Northern stockholders as long ago as January 21, 1924, received a statement of 1923 earnings and, on the other, because in the annual report itself there appears an earnings statement for the first six months of 1924 made available to stockholders before the regular monthly report for June was published. Mr. Budd has, in short, shown it to be his belief that his stockholders want information and he has given it to

them in language that they can readily comprehend. The Great Northern report we desire to compliment as being about the closest approach to the ideal in annual reports that the *Railway Age* has had in mind in all its discussion on this subject.

A Railway Convention in Germany

The American railroad officer who has the opportunity to go to Europe this summer will not find it necessary to charge all the time he spends to recreation. On the contrary, there are railway meetings and exhibits of sufficient importance in themselves to justify the overseas journey. Of these there is, of course, the British Empire Exhibition at Wembley, the attractions of which for American visitors of all classes are generally known. Moreover, there is an important railway technical convention to be held in Berlin on September 22-27. This convention will be held under the auspices of the Society of German Engineers (Verein Deutscher Ingenieure) in close association with the German State Railways, and all recent developments of a technical nature in the railway field will be thoroughly discussed. In connection with this convention there will be important and extensive exhibits of railway motive power, rolling stock and appliances. Indeed, from the announcement sent out by the Society of German Engineers, the railway exhibits at Berlin may rival in size and diversity those at Wembley. The time which any American railroad man could find to spend at either place would be spent to advantage.

Railway Employees and Government Ownership

PRIOR TO THE ADOPTION of government operation of the railroads as a war measure practically all of the leaders of the railway labor unions were opposed to government ownership. Practically all the members of the unions accepted the view of their leaders. The labor leaders then used labor union methods, not political methods, for improving the condition of the members of the unions. They tried to secure, and did secure, easier working conditions and better wages, but they defended rather than attacked the way the railways were managed. A striking illustration of this is afforded by an address delivered by Warren S. Stone, then grand chief and now president of the Brotherhood of Locomotive Engineers at the annual meeting of the National Civic Federation in 1911. Referring to the charge then just recently made by Louis D. Brandeis that the railways were inefficiently managed, Mr. Stone said: "Regardless of Mr. Brandeis' statement to the contrary, the American railroads are the best managed of any in the world. The men in charge of these great systems stand head and shoulders above the railroad men of the world. There is no other class of business that is operated on so close a margin, no other business where the details are watched so closely as on the average railroad."

That is what the labor leaders thought and said until government control was adopted. Then the views of most of them suddenly changed. They got many concessions from the government in a short time. Intoxicated by these results of government operation, they announced themselves for public ownership under the Plumb plan. They have been trying ever since to promote that policy and carrying on anti-railroad propaganda for that purpose. It is favored in the platform adopted by the "progressive" conference at Cleveland which was dominated by them. There is good reason to believe they have converted most of the members of the labor unions to government ownership.

Since the developments under government operation converted so many labor leaders and railway employees to public ownership, the views of Walker D. Hines on the question whether railway employees should favor government ownership are interesting and important. Mr. Hines was a railway officer before government operation. During the year that W. G. McAdoo was director general Mr. Hines was assistant director general. When Mr. McAdoo resigned Mr. Hines, undoubtedly on Mr. McAdoo's recommendation, was appointed director general and held that office for fourteen months.

No labor leader has ever thus far said a word to indicate that Mr. Hines as director general was not fair and friendly to the labor unions. He retained as his chief adviser on labor matters William S. Carter, who had been for years and was then president of the Brotherhood of Locomotive Firemen and Enginemen. Mr. Hines made many important concessions to labor contrary to the views and wishes of railway officers. He gave the train and engine service employees "punitive" overtime. He granted the shop employees and other crafts the "national agreements." He granted large advances in wages. In view of his record it would be most unfair and inconsistent for any labor leader to deny at this late date that he showed that he was a sincere friend of the railway labor unions.

With these facts as a background, railway employees would do well to read and ponder carefully an address that Mr. Hines delivered at a dinner to employees of the Great Northern at Minneapolis on August 2. The address is published elsewhere in this issue of the *Railway Age*. Mr. Hines expressed emphatically the opinion that railway employees in their own selfish interest should oppose, not favor, government ownership. He said that the late W. S. Carter agreed with him that government ownership would be bad for the employees. He warned employees not to be misled by the results of government operation, pointing out that the entire organization and management of the railways necessarily would be different under permanent government operation from what it was under the war time Railroad Control act. He showed that under government control the director general had autocratic power while under permanent government ownership the railways necessarily would be operated by government officers with limited powers, and that the way government departments function would in the long run result in the employees being paid less than they would be under private management, while at the same time the total cost of transportation that the public would have to bear would be greater.

Mr. Hines might have cited many indisputable facts in support of this view. The average wage of railway employees under private ownership in the United States before the war was greater than the average wage paid by any system of government railways in the world. The average wage in this country in 1913 was $757. The average wages in some countries where government ownership prevailed were as follows: Germany, $409; Italy, $377; Switzerland, $365; New South Wales (Australia), $619; Victoria (Australia), $623; New Zealand, $632. Railway wages were increased under government operation in this country, but the average wage has been higher in every year since the railways were returned to private operation than it was under government operation. The average compensation of all employees under government operation in 1918 was $1,419; and in 1919, $1,486. In 1923 it was $1,619. It is impossible now to make satisfactory comparisons between wages in the United States and Europe because of changes caused by the war in rates of exchange. In Australia however, where all the railways are government owned and operated the average railway wage in 1923 was $1,169, or $450 less than in the

United States. In the ten years between 1913 and 1923, during eight years of which the railways of the United States were privately operated, the average annual compensation of their employees increased $862, or 114 per cent. In the same years the average compensation of the railway employees of Australia increased only $535, or 84 per cent. During most of this time Australia has had a labor-socialist government such as the labor leaders, through the LaFollette movement, are trying to establish in the United States and yet under this government the wages of the railway employees of Australia increased much less both absolutely and relatively than the wages of railway employees in the United States.

Most railway employees do not know these facts. If they did an overwhelming majority of them would be opposed to the policy of public ownership which the leaders of their labor unions are advocating. Do the railway labor leaders know these facts? If they do not they are so inexcusably ignorant as to be unfit for their positions as leaders. If they do know them they are deliberately advocating a policy, the adoption of which they know would be contrary to the welfare of railway employees.

The plain fact is that the true interest of railway employees, and what the labor leaders conceive to be their own interest, are not the same. The railway employees want nothing but good working conditions and good wages. The railway labor leaders want more power and positions of greater prominence. They believe they would get them under public ownership. When railway employees awaken to a realization of their own true interest and of the fact that most of the railway labor leaders are advocating a policy absolutely contrary to the interest of most of the members of their unions there will be a lot of new railway labor leaders in this country.

Division Accounting and the Operating Officer

THE RAILWAY ACCOUNTING OFFICERS ASSOCIATION essays to have at its annual meetings two principal addresses by men whose position is such that they may be expected to bring to the meeting messages of real importance to the accounting officer. It is the custom to leave to the speaker himself the choice of a subject. The selection of speakers has been well made and similarly good has been their own choice of subjects. The result has been that each year addresses are made that can usually be properly taken as texts or guides for the broader aspects of the work that the association was established to accomplish.

At the San Francisco meeting of the association last month there was but one speaker, namely, William Sproule, president of the Southern Pacific, Pacific System. However, there was read from the platform a letter from Interstate Commerce Commissioner Joseph B. Eastman. Inasmuch as Commissioner Eastman had some rather pertinent things to say about the proposed revision of the classification of operating expenses, the force of what he had to say made up in some measure for the absence of the man himself. It would be nice to say that the association was unusually favored in being able to hear President Sproule's excellent address or Mr. Eastman's pertinent letter but the word "unusually" might be criticized on the ground that the association is "usually" favored in its choice of speakers.

President Sproule spoke on the subject of efficient accounting from the viewpoint of the executive or operating officer. This is a timely subject. It is timely because there is becoming apparent in railway service a new realization of the importance of the proper relationships of the accounting department and the operating and maintenance departments. This is a natural reflection of the modern tendency towards more scientific railroading, one of the aspects of which has been the greater use of the analyst and in general more scientific study of statistical and cost data.

The analyst who is called upon to do the work may or may not be in the accounting department. If he is in another department he nevertheless has to depend upon data supplied largely by the accounting department. It is a familiar feature of railway organization that the accounting department has a reputation for supplying the information asked of it by another department and not one bit more than what is asked. To cover the needs of the analysis made in another department the request for information must usually be broad enough to cover contingencies, which means that often much more data must be compiled than may prove entirely necessary for the analysis in hand or, on the other hand, much available data that might prove pertinent is not called for at all. We believe that every railroad officer who has done much of any analytical work will bear out the truth of the idea which it is here intended to convey. If so, he will agree that substantial savings would be possible through greater co-operation and the elimination of much working at cross purposes.

The accounting officer himself is frequently the one who conducts the analytical work. In that case co-operation between departments is dependent in greatest measure upon the degree of ability that the accounting officer shows in understanding the needs of the operating department and in knowing the essentials of the problem that it is desired to solve.

There are two sides to this problem. The *Railway Age* has stated on previous occasions its belief that the accounting officer has a certain responsibility to the other departments in this matter of analysis and that it is possible that the accounting officer sometimes may not realize his peculiar position in that respect. He is presumably especially fitted by training to be an analyst. On the other hand, the other departments similarly should heed that fact and feel free to call upon him for assistance and guidance in their analytical problems. If these thoughts appear theoretical the answer must be that they embody the expression of tendencies that are already evident on many railroads.

On another page of this issue there appears an article describing the method of division disbursement accounting in use on the Seaboard Air Line. This excellent article has been prepared by L. L. Knight, auditor of disbursements of that road. It is hardly necessary to repeat here the advantages that have been held to follow from the installation of the system because they are detailed so well by Mr. Knight himself. Two things, however, it is desired to emphasize.

One of these is the point made by Mr. Knight to the effect that the division disbursement accounting plan has served to bring about a better understanding of the respective problems of the operating and accounting officers. This results in part because the division auditor is on the staff of the division superintendent and ranks with the trainmaster, master mechanic or division engineer. It results in part also because it is a rule that when division auditors are appointed they must have evidenced tact in dealing with other branches of the service. It is a requirement also that they must have become familiar with general office methods. It is of interest that three of the present eight division auditors were formerly traveling auditors. One of the others was promoted from the position of local storekeeper and had served also in the transportation and mechanical departments.

The other point is the reference made to the ease of preparing special studies. As Mr. Knight puts it, inasmuch as the division auditor audits the basic cost reports, he has at hand the data available to permit him to prepare promptly and to render "statistics of cost and performance of any nature without having to depend upon other departments for

basic figures needed in the preparation of statistical reports." These two points represent two of the most important elements in that desired feature of proper co-operation between operating and accounting department.

Now, of course, division accounting in itself does not embody everything that is necessary to reach the ideal with respect to relationships between departments. Mr. Sproule, in his paper before the Railway Accounting Officers Association, said with reference to the division accounting methods of his own road, "I am by no means satisfied that the system as now provided accomplishes to any close degree the results that were hoped for. There is still a wide gap between the division superintendent and the division accountant. There seems to be a certain feeling of aloofness . . . " There are, no doubt, other executive and operating officers who would speak in a like vein about the division accounting systems on their own roads. One of the country's leading accounting officers was heard recently to offer the complaint that the operating officers of his road persisted in regarding the division accountants as accounting men exclusively and were very slow indeed to call upon them for the exercise of their intended broader functions.

The point is that division accounting offers one of the best methods that has thus far been proposed to bring together the accounting and operating departments so that assurance can be had that they are always working to the same end. The idea embodied in the division accounting plan is intended essentially to be the working out of the ideal that should rule in all the relationships between the accounting and operating or maintenance departments on the division or on the road as a whole. The ideal will be approached, however, only insofar as the one department can be brought to regard the problems of the other with a proper co-operative and get-together spirit. To our way of thinking, possibility of bringing about these things is the feature that offers the greatest promise of any in the division accounting system.

The Railway Officer of the Future

THE RAILWAY INDUSTRY is a constantly changing panorama in which the relative position of the different units or roads is steadily shifting. New roads are coming to the front, crowding into the background others which have long been looked on as examples of success. In some instances both classes of roads are the victims of changing conditions over which they have no control. More frequently, however, the results reflect the extent to which their managements are meeting these changes in conditions and are adapting their methods to these changes.

The railway officer of the generation which is now passing was characterized by his ability to meet emergencies by quick decision and prompt action. He came almost entirely from the hard school of experience and his success was due to his possession of a large degree of intuition or good judgment, by means of which he met a washout, traffic blockade or other emergency quickly and solved it by rule-of-thumb decision. His problem was to keep traffic moving and he succeeded well.

With the constantly increasing stringency of regulation, the growing exactitude of public demands for refinement of service and the drastic curtailment of revenues, another qualification has assumed major proportions. It is the ability to analyze revenues and expenses in order to detect and eliminate leaks. This cannot be done by rule-of-thumb methods. It can only be done by detailed and accurate analysis of all of the elements entering into one problem after another.

This is calling for a new type of railway officer who will not only be able to meet emergencies as they arise but who can also analyze the operations from day to day. It is calling for men of more education. The time when a college training was looked on with disdain by "practical" men has passed. It is becoming more and more a necessity as a foundation on which a structure of practical experience may be built. For this reason the number of college trained men who are moving into operating and executive positions is increasing rapidly.

The practice is also increasing of operating officers adding to their staffs men of this training, who, divorced from routine, can concentrate on one problem after another. Such studies take many forms. A short time ago the officers on an important railway found that, after spending several million dollars for additional facilities to increase the capacity and eliminate congestion at several points on an important division, no improvement in operation was effected, trains requiring practically the same time to cover the division and incurring practically the same amount of overtime expense as formerly. Obviously, either all or a portion of this expenditure was ill-advised or the operating department had not taken full advantage of it. The value of accurate analytical studies both before the authorization of an expenditure of this character and after the completion of the improvement to insure that it is utilized is apparent. From the standpoint of traffic solicitation such studies are also of fundamental importance for while a railroad must handle all of the traffic delivered to it, it is free to select that for which it will compete and it is in the judgment displayed in this selection that a large part of the success of any road lies. Such judgment, to be accurate, must be reinforced by data regarding the facilities required and other factors entering into the cost of handling this traffic as well as its volume and the income possible.

Constant scrutiny of all details of operating expenses is aiding more than one road in reducing its expenditures without detriment to the service. The problems of railway operation are rapidly becoming so intricate that rule-of-thumb methods must give way to those of more accurate analysis. Those railways are prospering most today which are co-ordinating the methods of the "theoretical" and "practical" schools to secure the good that can be derived from both.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Proceedings of the National Conference on Prevention of Railroad-Highway Crossing Accidents Under the Auspices of the National Association of Railroad and Public Utilities Commissioners, April 30-*May* 1, 1924. Methods in use and proposed for lessening grade crossing accidents discussed by railroad men, educators, and others. 140 p. Available from American Railway Association, New York City. $1.85.

The Reparation Plan, by Harold G. Moulton. An interpretation of the reports of committees of experts investigating Germany's ability to pay reparations. The Report of the Dawes committee is reprinted as Appendix A, p. 147-292, and includes the Acworth-Leverve report on German railways, p. 233-258, and the plan for operation of the railways by a company, p. 259-268. See also Index under "Railways." 325 p. Published by McGraw-Hill Book Co., Inc., New York City. $2.50.

The Twenty-Fifth Man, by Edward Morrell. Largely an account of a famous feud in California with the Southern

Pacific, by a former feud leader. 390 p. Published by the New Era Publishing Company, Montclair, N. J. $2.00.

These Eventful Years. The Twentieth Century in the Making. A thoroughly up-to-date synopsis by 84 leading students and writers of the accomplishments and "present state of the art" in almost every major field of human endeavor—science, industry, history, medicine, literature, music, art, religion, sport, etc. The work also contains an account of the war and its effects, sums up the situation in international relations and gives an account of internal conditions in every important country in the world. "The editor believes strongly that he serves the cause of truth best when he writes in this book the differing viewpoints of men coming from many countries scattered over the continents of the world, each giving his version of events as he has seen them." Published by the Encylopaedia Britannica, Inc., New York. In two volumes of 692 pages each. Price, cloth bound, $11.50.

Periodical Articles

Agriculture and Price Stabilization, by Wm. R. Camp. Factors affecting marketing of farm products, work of organizations of producers in various sections, influence of "ease of transportation," "Relative cheapness of long-distance freight" among other things on further organization, etc. Journal of Political Economy, June, 1924, p. 282-315; August, 1924, p. 441-467.

Cuba Northern Hitting Its Stride. Expansion and improvement under control of Col. Tarafa. United States Investor, August 9, 1924, p. 5-8.

Grouping of Railroads in Plans of Consolidation by Inter-State Commerce Commission. The roads are listed alphabetically with the number of system to which each is assigned in Ripley and I. C. C. Tentative plans in parallel columns. Commercial & Financial Chronicle, August 9, 1924, p. 628-629.

The Labor Clauses of the Clayton Act, by Alpheus T. Mason. American Political Science Review, August, 1924, p. 489-512.

Motor Transportation of the Future, by Elihu Church. Effect on railroad business considered. Shipper & Carrier, August, 1924. Also available separately in 4-page pamphlet.

The Railways—And Problems. Editorial considering probable effects of extension of air and motor transport services on railroad business. Pacific Coast Shipper, August 1, 1924, p. 4-5.

Settlement of International Status of Tangier, by Rear Admiral A. P. Niblack. "After the completion of the port, the first thing we may look for is a railway line from Tangier through French Morocco, to connect at Casablanca with the broad-gage railroad being built from that port to Dakar, and then a steamship line from Dakar to Rio Janeiro, Montevideo and Buenos Aires, making it possible to go from Paris to Rio Janeiro in ten days," p. 826. Current History, August, 1924, p. 824-827.

Seasonal Storage of Coal. Summary report by Federated American Engineering Societies. "In the past the operators have said that storage is the duty of the railroads, whereas the carriers have contended that it is the duty of the consumer, and as a result storing has been neglected * * * " quoted from foreword by John Hays Hammond. Finding Nos. 8-13 relate to transportation, p. 499-500. Mechanical Engineering, August, 1924, p. 498-500.

Two Million Laws, by Simeon D. Fess. " * * * We have now in force approximately 2,000,000 laws and ordinances, which are being increased at the rate of 200,000 a year," p. 1. Country Gentleman, August 2, 1924, p. 1-2.

When the Government Keeps the Books. A Surplus Is Not Always a Surplus as in the Case of the Canadian Operated Railways, by J. L. Payne. Nation's Business, August, 1924, p. 25-26.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Operating Ratio Not Measure of Efficiency

NASHVILLE, Tenn.

TO THE EDITOR:

I have read with interest comments of X. H. Cornell in your issue of the *Railway Age* dated July 19, under the heading "Are we suffering from too many experts?"

Any favorable effect which this article might have had upon me was entirely dissipated by the paragraph reading as follows:

"After all it is the operating ratio which tells the story of efficiency; whether it is in fuel, wages, maintenance, transportation, per diem, loss and damage, or train load does not matter so much."

The operating ratio is generally understood as the ratio which the operating expenses bear to operating revenues. If Mr. Cornell understands the operating ratio to mean this, then he is clearly wrong in his statement, as one road might have an operating ratio of 99 and another 65, yet the road with the 99 per cent operating ratio could be far more efficiently operated than the one having a 65 per cent operating ratio.

J. B. HILL,
Assistant to President, Nashville, Chattanooga & St. Louis.

How European Roads Maintain Fast Schedules

HEATH, Mass.

TO THE EDITOR:

One of the first things which impresses an American railroad man in England, and to some degree in France, is the number of trains with schedules calling for an average speed in the neighborhood of 60 m.p.h. It might be thought at first sight that these speeds are obtained by excessively fast running and that, therefore, they are only suitable to special conditions. Experience will show that the maximum speeds attained seldom exceed those in America. The secret lies in the fact that all unnecessary slow-downs are eliminated. Important stations and junctions are passed without speed reduction and with proper precautions. There is no reason why this should not be done.

Every slow-down involves not only a loss of time, but all the losses, though in a lesser degree, of a stop. In America where crowds are perhaps more difficult to control, island platforms at large towns could be divided longitudinally by a barrier with gates. This would allow passengers access to a local train, at the same time keeping the other side clear so that an express could pass at high speed with no danger of passengers being near.

To illustrate, I traveled in England on a Great Western train which was timed to run from Swindon to London, 77¼ miles, in 75 minutes. The train was made up of nine coaches and weighed about 300 tons. It was hauled by a 4-6-0 four-cylinder simple locomotive. Although this load is light according to American standards, the engine is proportionately smaller. We left Swindon on time and in a rather

leisurely fashion accelerated to a speed of 70 m.p.h. For the next 50 miles we did not exceed this rate or fall below 65. We passed Didcot, Reading and Slough, all large towns and junctions, without slowing down, the platforms adjacent to our track being clear of people. Only after passing Slough was 80 m.p.h. reached. The speed on approaching the terminal was very much higher than we are accustomed to in America and only in the last mile did it drop below 30 m.p.h. Paddington (London) was reached exactly on time.

Another example of steady going may be cited, this time on the Nord in France. The run was from Aulnoye to Paris, 134 miles, with a schedule time of 142 min. The train consisted of 10 cars weighing about 320 tons, hauled by a 4-4-2 four-cylinder compound built about 20 years ago and recently equipped with a superheater. We left 20 minutes late and, as usual with French compounds, attained speed very rapidly. There were no slow-downs, except two to 15 m.p.h. caused by relaying track. The 51 miles from Le Cateau to Noyon were covered in 44½ minutes and a great many kilometers were run in 30 seconds, or at 74½ m.p.h. This is the maximum permitted in France. St. Quentin, Compiegne and Creil, all important stations and junctions, were passed at 65 m.p.h. or more. A long grade from Creil kept the speed down to from 55 to 60 m.p.h. for some 10 miles. St. Denis, 130 miles, was passed in 132 minutes and we reached Paris in 140. It is of interest that this run was accomplished on one tank of water, an extra large one (by French standards) being used for this service.

Another striking feature in Europe is the good branch line service and connections, due probably to much less competition from motor cars, both public and private. Other services much appreciated are what may be termed "cross-country" expresses; that is, at right angles to the general lines of travel, running in many cases daily or, where traffic does not warrant this, three or four times a week. Thus where formerly it was necessary to travel by locals with changes and long waiting at junctions, or to go around by a longer route, it is now possible to make the journey quickly and comfortably.

W. G. LANDON.

Safety in Railway Shops

HOUSTON, Texas.

TO THE EDITOR:

The always manifest interest of the *Railway Age* in everything that may have a bearing upon safety of operation as applied to the railway employee is sufficient excuse for bringing to your attention a rather forceful illustration of the fact that injuries to these employees can be reduced to a minimum in proportion to the sympathy and earnestness with which the subject of safe practices is approached by employees and their supervisors.

The El Paso shops of the Southern Pacific's Texas and Louisiana Lines, employ on an average, 1,000 men in all departments, including the enginehouse. The principles of safety have been taught in this and other departments of the service for years and with gratifying results. November of last year passed in the El Paso shops without a serious or reportable injury to an employee. Master mechanic, general foreman and department foremen canvassed the situation with the men, and December followed, also with a clear record, as a result of an unremitting campaign against carelessness, and the cultivation of safe practices.

To make a long story short, the El Paso shops demonstrated a freedom from injury that carried through a total period of seven months, one injury occurring in June which broke into a most satisfactory zero performance, yet leaving a record of 1,079,526 man hours without a single "reportable" injury, June showing one injury for 151,383 man hours worked in that month.

Another splendid record for our mechanical department is the record of the Algiers, La., main shops which worked 1,315,477 man hours during the first six months of 1924 with a record of only three injuries reportable to the I. C. C., or one injury for each 438,492 man hours worked in these shops.

Again, as an additional evidence of how "caution" is becoming an abiding factor among the employees of these lines 105,176 man hours were worked by the entire mechanical forces in June for each injury reported.

H. M. MAYO,
Superintendent of Safety.

The Flagman as a Safeguard

Akron, O.

TO THE EDITOR:

We have read the article by J. Lowell White in your issue of July 26, advocating the discontinuance of flagmen in automatic block signal territory. In our opinion such a change would remove one of the important safeguards which a railroad management feels is absolutely necessary to insure the protection of the property as well as the lives of its patrons.

Regardless of the instances cited, which developed divided responsibility, it is a fact that such cases only indicate a lack of previous supervision in the making of surprise efficiency tests on enginemen, as well as flagmen. Our experience has taught us that only by surprise tests can enginemen and trainmen be kept on the alert and alive to their responsibilities. Numerous instances could be cited where a flagman, by strict observance of Rule-99, has saved the day by flagging properly and stopping a following train. Especially does this apply where fog interferes with the range of the engineman's vision. We are wondering if Mr. White has ever ridden a locomotive in a dense fog when it is almost impossible for an engineman to see the front of his locomotive, or the automatic signals which have so much to do with the safe operation of his train. If so, how can he advocate doing away with the additional safeguard, the flagman, who is so essential on such occasions, and who can indicate to the engineman by deliberate and proper flagging the fact that the preceeding train is properly protected, thus enabling the engineman in turn to handle his train properly, bringing it to a stop.

It is a fact that the railroads have spent millions for automatic signals to provide safety for high speed trains, but it is also a fact that they are spending millions in maintaining a flagman on every train for the express purpose of protecting it according to the rules. If they are not getting the result expected, it is due to improper supervision.

Also, we cannot agree that the practice of "blowing out" and "calling in" flagman is an old fashioned nuisance. We feel that this obligation tends to interest the engineman and the flagman, as well as the rest of the crew. Flagging creates, on the part of the traveling public, a sense of security in the knowledge of the fact that their train is being protected properly. However, we agree that on roads which permit their flagmen to stand at the rear of a train, or within a car length or so of it, it is simply a waste of time for the engineman to "blow out" the flagman.

C. P. ANGELL,
Trainmaster, Baltimore & Ohio.

FOLLOWING an offer made by the Koppel Industrial Car & Equipment Company to pay part of the premiums upon a group policy covering the lives of all its employees, two hundred and fifty workers, at its Koppel, Pa., plant, have been insured for $300,000 for amounts ranging from $1,000 to $2,500. Any employee, if sick or injured, also will receive a payment of $10 a week for a maximum of 26 weeks, and under the same conditions will be entitled to the free services of the insurance company's nurse.

Type of Bus Operated in Tours Service

North Shore Line Eliminates Bus Competition

Chicago, North Shore & Milwaukee Operates Its Own Fleet of Highway Coaches Tributary to Main Line

IN RECENT YEARS motor bus lines operating on the highways have made serious inroads into the passenger revenues of the railways. This competition, which has been developing for a relatively short time, threatens eventually to take from the rails a large proportion of their short haul passenger traffic. Up to the present time the few roads which have attempted to meet this competition have adopted the defensive tactics of operating unit rail cars on their tracks at somewhat more frequent schedules than those of the ordinary trains. At least one line, however, the Chicago, North Shore & Milwaukee has adopted more aggressive measures by means of which it has virtually eliminated bus competition from the territory served by its lines.

Interior of One of the Buses

The North Shore Line, as it is called, is an electric railway operating high-speed passenger and merchandise trains on an 86-mile line between Chicago and Milwaukee, Wis. Its tracks traverse the thickly populated suburban district on the lake shore north of Chicago and serve the industrial communities of Waukegan, Ill.; Kenosha, Wis., and Racine. Two years ago the prospect of competition from small bus lines on the excellent highways throughout the area served by the North Shore Line was imminent. It faced the same situation which railroads throughout the country faced then and are facing today in a more aggravated form. It determined, therefore, to supply the demand for bus service itself. A beginning was made when the company purchased several White motor coaches and established its own highway service between Kenosha, Wis., and Lake Geneva, a popular summer resort town not reached by its rail lines. Last year more coaches were purchased and additional routes established. The North Shore Line's plans for the future are such that within a very short time its own buses will cover the entire lake shore district between Chicago and Kenosha, both as feeders to the main line and as local passenger carriers with tour service extending well beyond its lines into central Wisconsin.

Eliminating, Not Fighting, Competition

The purpose of the North Shore Line in establishing its own bus service was to meet a dangerous potential competition, not by a struggle with it for traffic, but by rendering the operation of independent bus lines unnecessary. It was recognized that the motor bus offers a form of transportation for which there is a definite place in the general transporta-

tion scheme and which it is impossible for the railroads, restricted to their own tracks, to offer. It was also believed that tactics adopted by those few railways which were trying to overcome the competition, that of somewhat more frequent service on their own rails, were not markedly successful. Operating its own buses seemed to be the best weapon against the proposed operation of independent lines, particularly if better buses were used than independent owners could afford. This plan was adopted and put into practice immediately.

At the present time the North Shore Line operates motor coaches on five routes. One of these extends from Kenosha to Lake Geneva, a distance of 33 miles, and, since few stops are made, operates on a fast schedule. The buses make four trips in each direction on this line daily throughout the year, and during the summer months the traffic to Lake Geneva is so heavy that greatly augmented service is provided. Through service via train and bus from Chicago is also offered.

Another line operates between Kenosha and Waukegan, a distance of 15 miles. Although this bus line parallels the main line of the railway, it serves the centers of a number of towns which the main line does not touch. This is due to the fact that the main line is approximately one mile west of Sheridan Road, on which the buses operate. This route carries a heavy business throughout the day, traffic being about evenly divided between local passengers and through passengers for the main line trains. Although this line does not reach out into entirely new territory as does the Lake Geneva line, it nevertheless is a valuable supplement to the regular train service. Thirty-one trips are made in each direction daily.

A third bus route operates from Waukegan to Highland Park by way of a highway which parallels the main electric line but is about two miles west of it. Thus a practically untouched territory is reached for its local traffic and a considerable amount of through business is secured for the main line.

A fourth route is from Highland Park to Wilmette on a highway which parallels the main line and is about four miles west of it. It also covers a region inadequately served

City Type Bus Used on Routes of Frequent Stops

by the main line and handles a heavy local and through passenger business. Like the Highland Park-Waukegan line, it serves a number of golf clubs to which a heavy traffic is carried. On this line 16 round trips, 10 of which are through, and six stub trips, are made daily. The fifth and latest route is from Waukegan to McHenry, Ill., a distance of 35 miles, through a territory not otherwise served.

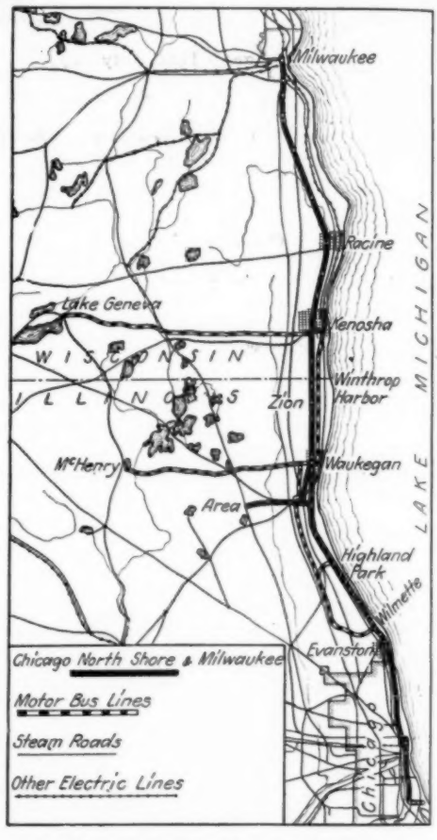
It will be seen that of these five routes, the Lake Geneva and the McHenry lines are the only ones which reach out into entirely new territory. The others are supplementary to the main line and assist the railway in covering its territory thoroughly. Eventually the North Shore Line plans to establish more routes running some distance west of the main line as tributaries to it.

Through tickets are sold to and from towns situated on the bus lines for use both on the coaches and on the regular trains. Thus a passenger for Zion, Ill., may purchase a through ticket from Chicago, leave the train at Waukegan, and transfer to the bus which takes him to his destination. Likewise the passenger from Zion to Chicago purchases his ticket at Zion, rides on the bus to Waukegan and transfers there to the main line train.

This summer the North Shore Line is also operating for the first time extensive motor coach tours through the state of Wisconsin. Tourists are carried on an all-expense basis from Chicago to Green Bay, Wis., on a seven-day trip and to nearer points on shorter tours. A week-end excursion to Lake Geneva is also offered.

Characteristics of Bus Service

The North Shore Line now has 43 coaches of various sorts in its service. Nineteen of these are 25-passenger Model 50 White buses, 6 are 22-passenger Fageol coaches of the Inter-City type, 3 are 29-passenger Fageol city-type buses and 13 are 29-passenger Yellow coaches. Two other coaches are of the parlor car type with individual seats, one of these being a four-cylinder Fageol accommodating 11 passengers and the other a six-cylinder Fageol accommodating 20 passengers.



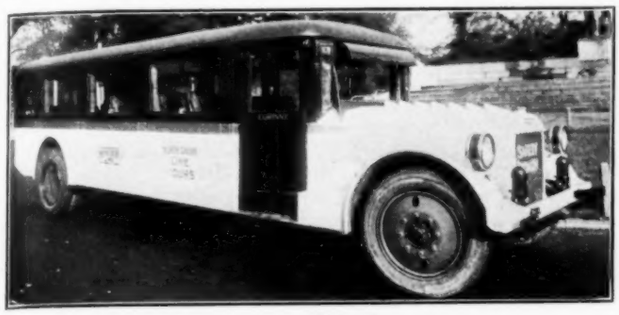
The Lines of the C. N. S. & M. and Its Motor Bus Routes

Regular passenger stations with waiting rooms, lunch counters and checking facilities are operated in Kenosha and Lake Geneva. The buses have scheduled stops at all towns through which they pass and in addition stop to take on or let off passengers at crossroads and other points.

Some idea of the magnitude of the North Shore Line bus operation is gained from the passenger and mileage figures for the various routes in 1923. In that year the Kenosha-Lake Geneva line carried nearly 50,000 passengers and operated its buses a total of over 130,000 miles.

The coaches are all of the most modern type, and are maintained to a high degree of efficiency. A large garage and repair shop is soon to be built at Waukegan. Repairs are made under the direction of the master mechanic of the road. The coaches have leather upholstered spring seats and run on 36 by 6 in. pneumatic tires, two on each rear wheel and one on each front wheel. In addition many of the

coaches are equipped with pneumatic shock absorbers. The average gasoline consumption is about 7 miles per gallon. The coaches operated on the routes where frequent stops are made are entered and left through the single door at the front of the coach but the coaches operated in the tours service, where few stops are made, have doors at the end of each seat, the seats extending entirely across the body without



Fageol Inter-City Type Bus

being separated by an aisle. The average cost of operation of the buses, computed on the basis of the million miles which they have operated, is approximately 30 cents per bus mile.

Reasons for Bus Service

In spite of the fact that its bus operation last year incurred a loss for the North Shore Line, the officers of the road feel that the operation of the buses was profitable to the company in many ways. In the first place, a considerable amount of passenger business was brought to the North Shore Line which otherwise would not have reached its main line. Through their more frequent and better service the buses have been directly instrumental in developing traffic where none or little existed before. Furthermore, the buses have served as an advertisement for the company and, in reaching out into new territory, have secured many new patrons which before probably hardly knew of the existence of the company. Third, by supplementing its main line service to the benefit of its patrons in its own territory, it has done most constructive work in securing the hearty good will of the citizens of the territory it serves. An interesting illustration of the way in which the establishment of the supplementary bus routes was received by the people is offered in the reception from the citizens of Kenosha, Winthrop Harbor, Zion and Waukegan. The people in these towns, although near the North Shore Line and the Chicago & North Western, nevertheless were inconvenienced by the fact that the railroad's tracks skirt the west side of the villages. When the North Shore motor coach service was established through the center of these towns, the event was celebrated by a banquet attended by city officials and officers of the road.

The main reason for the continuation of the bus service, however, is that it keeps out the horde of small bus owners who would otherwise be constantly springing up. While these small owners rarely last for a considerable time, yet during their existence they cut into railway revenues to no inconsiderable extent. By operating its own buses, thereby keeping out the others, the North Shore Line has saved itself many thousands of dollars in passenger revenue which otherwise would have been lost. The menace to the company's revenues thus being removed, its credit has been maintained unimpaired. In more than one instance, this has been the deciding factor in the retention of the confidence of stockholders who had become apprehensive of the inroads made by independent buses on many other interurban railroads.

Index of Railway Car and Locomotive Prices

Equipment Committee of President's Conference Committee on Federal Valuation Presents Comparisons

THE COST OF EQUIPMENT has doubled since the pre-war period. The price of equipment was higher in 1923 than in 1921 and 1922 but not as high as was reached in the peak of 1920. On a base of the average prices from 1910 to 1914 as 100 the indexes of equipment prices in 1923 were as shown in the small table in the next column.

INDEX NUMBERS OF EQUIPMENT PRICES, 1923

Locomotives	224
Passenger train cars	194
All-steel freight cars	203
Freight cars of composite construction	209
All wood freight cars	201

These prices and the indexes are figured on a per pound

INDEX OF RAILWAY EQUIPMENT PRICES

STATEMENT SHOWING THE NUMBER OF UNITS SOLD, THE WEIGHTED AVERAGE PRICE PER POUND AS SOLD (EXCEPT WHERE ESTIMATED; SEE NOTE No. 4) AND THE PER CENT OF INCREASE IN PRICE, USING THE WEIGHTED AVERAGE PRICE, 1910 TO 1914, INCLUSIVE, AS BASE, OR 100 PER CENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Locomotives			Freight cars: All steel			Freight cars: Composite wood and steel			Freight cars: All wood			All steel passenger train cars (steel underframe and all wood cars—see notes 3-d)	
Year or period	No. of locos.	Price per lb., cents	Per cent	No. of cars	Price per lb., cents	Per cent	No. of cars	Price per lb., cents	Per cent	No. of cars	Price per lb., cents	Per cent	No. of cars	Per cent
1910-1914, incl base	10,583	7.385	100	71,108	2.57	100	148,047	2.51	100	53,349	2.26	100	4,116	100
1910	2,901	7.265	98	10,455	2.68	104	18,555	2.63	105	13,739	2.30	102	799	109
1911	1,608	7.255	98	13,850	2.30	89	32,918	2.31	92	13,720	2.17	96	508	96
1912	3,269	7.350	100	17,803	2.39	93	46,348	2.47	98	17,665	2.31	102	821	94
1913	2,066	7.890	107	22,598	2.83	110	25,898	2.84	113	2,600	2.11	93	1,212	100
1914	739	6.873	93	6,402	2.49	97	24,328	2.37	94	5,625	2.25	100	776	98
1915	981	7.413	100	13,050	2.63	102	24,752	2.54	101	4,350	2.11	93	396	89
1916	2,170	10.542	143	21,307	4.01	156	14,650	3.67	146	12,396	3.19	141	687	105
1917	1,586	15.513	210	4,750	5.11	199	14,500	4.25	169	3,200	4.54	201	548	135
1918	1,976	15.225	206	12,383	6.36	247	43,000	6.35	253	None	(5.72)	(253)	16	169
1919	273	15.637	212	None	(6.82)	(265)	None	(7.09)	(282)	None	(6.37)	(282)	31	205
1920	1,458	19.074	258	13,480	7.03	274	12,950	7.47	298	None	(6.73)	(298)	553	231
1921	326	15.923	216	4,200	4.50	175	12,450	4.94	197	None	(4.45)	(197)	47	163
1922	1,910	14.924	202	32,181	4.00	156	51,597	4.39	175	None	(3.96)	(175)	1,182	160
1923	1,726	16.551	224	19,875	5.21	203	26,140	5.24	209	4,800	(4.54)	(201)	407	194

(See notes explaining this table at top of following page.)

NOTES EXPLAINING TABLE AT BOTTOM OF PRECEDING PAGE

(1) The data on rolling equipment is based on the total selling price of the entire output of two large locomotive and seven large car companies with certain sales excluded such as the Pershing locomotives and locomotives and cars sold to foreign countries.

(2) The price per pound is a weighted average composite price of all classes of equipment coming under each of the general headings.

(3) All prices and percentages shown in above table were determined from actual data furnished by the manufacturers with the exception of those in parentheses, which were estimated in the following manner—

(a) All steel freight cars, composite freight cars—Price and percentage for 1919 were derived by interpolating between actual prices reported for 1918 and 1920 (1st 6 mos.).

(b) All wood freight cars—The percentages for composite cars were used, and from these percentages the price per pound was calculated using the weighted average price of all wood freight cars for 1910 to 1914, incl. as base, or 100 per cent.

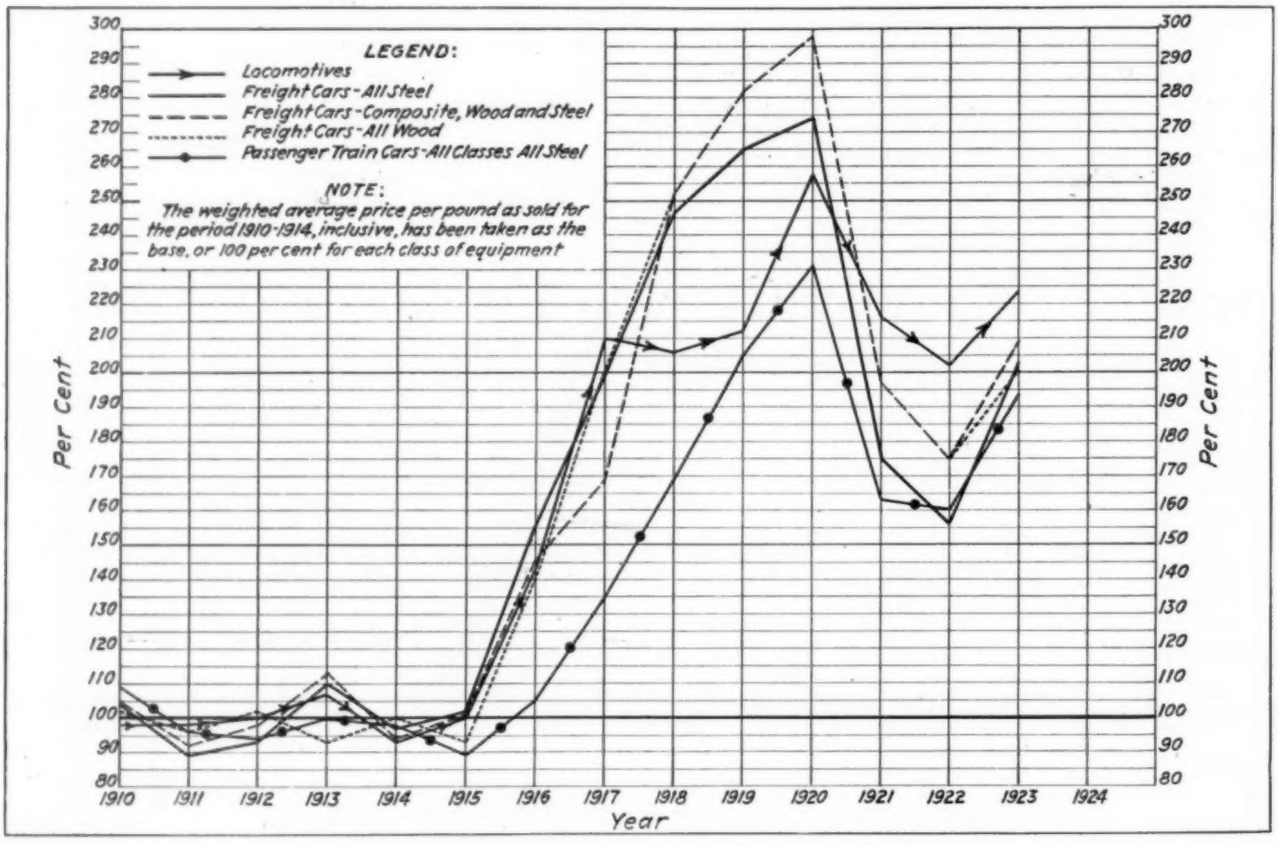
(c) All steel passenger train cars, floating equipment—Derived by interpolating between "trend of price" factors shown in equipment committee's reports (Passenger Train Car Report, dated June 1, 1921, and Supplement No. 1, and Floating Equipment Report, dated December 30, 1920).

(d) Wood with steel underframe and all wood passenger train cars—No sales reported (except five for steel underframe) 1915 to 1923, incl. If sufficient wooden cars had been sold to make the market, it is felt that the increase in price over the weighted average price 1910 to 1914, incl., would have been at least as great as that for all steel cars; therefore the percentage factors shown for all steel passenger train cars (Col. 15) are recommended for application to the wood with steel underframe and all wood passenger train cars.

basis of the simple or standard locomotive or car and do not include the specialties; in other words, they do not reflect the increase in size of equipment in the period which has been covered.

This information has been prepared by the equipment committee of the President's Conference Committee on Federal Valuation which prepared studies of the cost of locomotives, freight cars and passenger cars for valuation purposes some years ago. The information as issued at this time is in the form of supplements to the original studies. Detailed descriptions of the methods followed in compiling the information will be found in the two following articles: "The Cost of Locomotives for Valuation Purposes" which appeared on page 387 of the *Railway Age* of September 3, 1920, and "The Cost of Reproduction New of Steel Freight Cars" which appeared in the *Railway Age* of March 11, 1921, page 553.

Averages for the period 1910 to 1923 as worked out by the equipment committee in co-operation with certain of the equipment builders are given herewith in the form of tables and charts.



Relative Prices of Cars and Locomotives, 1910 to 1923

THE FIRST PART of a transcontinental test for receiving long distance messages by radio on a moving train was completed on August 8 when F. A. D. Andrea, a radio manufacturer of New York, arrived in Chicago on the Broadway Limited of the Pennsylvania. The purpose of the test was to make a check of a neutrodyne receiver, to ascertain particularly the variations of the signal intensity of various broadcasting stations received, as well as to study the interference met with in operating an extremely sensitive radio receiver aboard a fast moving train. The experiment was continued on the same day when Mr. Andrea left on the San Francisco Overland Limited of the Chicago & North Western-Union Pacific-Southern Pacific for San Francisco, Cal. On both trains the antenna consisted of weather-proof copper wires running lengthwise on each side of a Pullman car.

Why Employees Should Oppose Nationalization*

Wages Probably Would Be Lower and Operation Less Efficient Than Under Private Management

By Walker D. Hines
Formerly Director General of Railroads

I WISH TO GIVE you the benefit of my view as to what would be the effect of government ownership and operation of the railroads upon the railroad employees. The views I am going to express to you are based on my study of the interests of the railroad employees during the period of federal control. During the fourteen months that I was Director General of Railroads, from January, 1919, to March, 1920, I felt a direct responsibility to all the railroad employees of the country, and I tried to the best of my ability to study their troubles and their needs.

Naturally I had occasion to consider the question of permanent government ownership of the railroads, and how it would affect the public generally, the railroad employees, the owners of the railroads and the railroad officers. The result of my study was that I became convinced that government ownership would be bad for everyone of these interests, including the employees themselves, and I want to tell you now why I think it would be bad for the railroad employees.

In forming this opinion during federal control I had the benefit of the experience and advice of W. S. Carter, who was for many years the chief of the Brotherhood of Locomotive Firemen, and who had a very clear and sound understanding of the interests of railroad employees. He was emphatic in his private talks with me and in his public speeches in saying that government ownership would be a bad thing for railroad employees, and he frequently used the case of the post office employees as an illustration of the disadvantages of working for the government instead of for private corporations.

A good way to study this matter is to think about what the practical situation would be if the United States government should buy and operate the railroads. In that event railroad operation would likely be under the direction of a member of the cabinet, just as the management of the post office is under the direction of the postmaster general. But if railroad operation was not directed by a member of the cabinet it would likely be directed by some commission of perhaps five or seven men, whose principal office would be in Washington.

The railroad employees, in seeking to get better wages, or better working conditions, or more satisfactory treatment as to their grievances, would have to deal with the United States government. They would have to appeal to this cabinet member or to this commission, or bureaus of government officers who would be appointed for that purpose. I suppose the railroad employees would be permitted to keep up their various labor unions and these labor unions would be permitted to handle all these matters with the proper government officers. I say I suppose that the railroad labor unions would thus be allowed to represent the employees, but I am not sure that I have any good basis for this view, because I do not understand that the post office employees have ever succeeded in handling their matters very effectively with the government through any sort of labor unions.

Government Hard to Move

But if the railroad labor unions should be allowed to handle these matters, as I suppose they would be, how far would they get in dealing with the United States government? That is a point of very vital and practical importance to railroad employees. The United States government is big and hard to move and it can find any amount of excuses for not moving. The cabinet member or commission in charge of the railroads would no doubt have to get the authority of the President, and the President could not go very far without getting the authority of Congress. We all know how "passing the buck" has become a fine art in Washington. A cabinet member cannot act because of the President, the President cannot act because of Congress, and Congress may not act because of disapproval of what the cabinet member or the President has done. Things can go around in a circle indefinitely.

We have a striking illustration of this in the efforts of the mail carriers to increase their very small pay. They made a long and hard fight to get an increase. They seemed to conduct a campaign throughout the country. I suppose they sent postal cards to a large number of the voters, asking the voters to write to their congressmen to support an increase in wages. I know I wrote in favor of the increase to several senators and congressmen. At last, after months and even years of effort on the part of the mail carriers, Congress passed the bill, and then the President vetoed it because Congress had failed to provide the money. This was a case where the postmaster general could not pay more wages unless Congress authorized him, and after years of delay, when Congress did authorize it, the President vetoed it, so the mail carriers are still without their increase in pay.

It is well for railroad employees to think about these things in advance of supporting a plan of government ownership and operation of railroads.

Work of Railroad Labor Board

Another thing that would work against the employees, if the government owned and operated the railroads, would be that it would be almost impossible to get improvement in wages or working conditions, except for the country as a whole, because if the government handles the matter it will find it difficult to make any difference in pay or working conditions between the man who is working in Idaho or Texas and the man who is working in New York City. The result will be that the necessity for improvement in wages or working conditions will have to be understood and appreciated throughout the whole country, and the President and the cabinet member and Congress will have to be willing to permit the change for the whole country before it can be successfully accomplished. Under private operation improvements in wages and working conditions may be obtained on particular railroads in view of their special conditions, and this may become a precedent helpful to the employees for securing favorable action elsewhere. This means there is more chance for gradual improvement through special and local changes under private operation than there would be under a plan where the United States government would operate all the railroads in the country.

I believe there is a good deal of opposition on the part of railroad employees to the Railroad Labor Board. My own judgment is that this opposition is mistaken. It is true that the Labor Board has not been able to deal promptly with all

* An address delivered at a dinner given to Great Northern employees at Minneapolis, Minn., Saturday evening, August 2.

the matters which have come before it and it is, of course, true that its decisions have not been satisfactory to either side. My judgment is that the Labor Board is a better method for dealing with controversies between the employees and the railroads than any other plan that has been proposed. Other plans may seem to be better, but careful study will, I believe, show that they are not as good. However, I do not wish to argue this matter tonight. What I do wish to point out is that if there is government ownership and operation of railroads the employees will be in the hands of a Labor Board that will be vastly more unsatisfactory to them than the present Labor Board. The cabinet member in charge of the railroads, or any commission that may be put in charge of them, will constitute a sort of Labor Board and will decide these questions in a way that will be final and controlling. The present Labor Board has no power to make a final decision that is absolutely binding upon either the railroad or the employees. The Labor Board's decision is simply advisory, and tells the management and employees and the public what the Labor Board thinks is right. But when the government agency decides these matters under government ownership and operation, that decision will not be advisory, but it will be final. The employees will find again that they have less freedom of action when dealing with the government than they have when dealing with the railroad companies under the present situation as to the Labor Board. My advice is that railroad employees should be extremely careful not to let their present and, I believe, temporary irritation towards the Labor Board cause them to support a scheme of government ownership which would give them a sort of Labor Board far more unsatisfactory.

War-Time Government Control No Criterion

I especially advise you not to be misled by the results that were accomplished during federal control in 1918 and 1919. Many employees may think that there were many advantages gained by the employees during that time, and that this was because the government was in charge. The employees may reason from this idea that if the government permanently owned and operated the railroads there would always be the same chances for further improvement to be gotten on short notice. But any such notion is absolutely wrong.

It is true that during Federal control important advantages were obtained by the railroad employees. The right of collective bargaining was recognized as applying to all employees on all railroads, while before federal control some classes of employees on some railroads could not get any recognition at all for any unions that they might form. Working conditions were established for practically all employees on practically all railroads. These things represented very important progress for the employees, but these things came about because of the very special conditions which existed during the war, and which would not exist in time of peace.

Federal control was a war measure. The law which established it set aside all usual methods of government action. The law gave the President practically absolute power to raise rates and wages and change working conditions for the purpose of federal control, without consulting Congress or the Interstate Commerce Commission, or anybody else. President Wilson was intensely occupied with the war, and with his efforts to bring about peace throughout the world, so he delegated all of his powers concerning the railroads to the director general of railroads, and left the entire matter to the director general. In this way the director general had complete authority and did not have to consult either the President or Congress or any commission. Besides that, and because this was a war measure, Congress did not try to interfere and the director general had a free hand, particularly in 1918, which nobody in charge of operating the railroads for the government in peace time would ever have. Further than that, there were certain very big things that had to be dealt with quickly on account of conditions created by the war. These were so big it was necessary for the director general to decide them and he had the power to decide them, and he could and did decide them promptly. This was true as to the question whether collective bargaining would be permitted for all railroad employees. It was true as to changes in working conditions. It was true as to wages. All these things came up in such a big way that the director general had to consider them and dispose of them. But these big things have now been dealt with, and in the future any specific demand made by railroad employees is not likely to be such a big nation-wide matter as to force a clear-cut decision, and besides there would be nobody in charge of the railroads for the government who would have the complete powers that the director general had. Hence on the one hand you would have an officer in charge of the railroads who would not have the power to grant permanent and favorable action, and on the other hand you would have a situation that many of the things sought by the employees would not be sufficiently nation-wide in their importance to force nation-wide action, and the government would be unwilling to move at all unless the matter was one where it was clear that it ought to move for the entire country and make a change that would operate throughout the country.

An interesting illustration of the difficulties of Government operation happened in March, 1919, while I was director general. In order to carry out the purpose of federal control I asked Congress for an appropriation of $750,000,000. The House promptly passed that appropriation; the Senate committee promptly reported it favorably, but a group of senators decided it would be a good idea to embarrass the President by preventing the passage of this and other appropriations, so they filibustered until the session expired on March 4 without passing this appropriation. That is one danger that would always confront government operation of railroads. At any time some vital appropriation might be defeated for purely political purposes and might greatly embarrass railroad operation and the interests of the employees.

In the case I refer to it happened that I had just worked out a plan for giving the train and engine employees increases in pay to correspond with those which had been given by my predecessor to other classes of railroad labor. In order to carry out this arrangement with the train and enginemen, it was, of course, necessary to pay out more money to them than before. An officer in my position might have said that the defeat of this appropriation would make it necessary to postpone indefinitely the granting of this increase. This is one of the ways in which a government officer could "pass the buck." But as director general, exercising war powers, I had more authority than any government head of the railroads would ever have in time of peace, and I felt that the train and enginemen ought to have this increase and I proceeded to give it to them as soon as the schedules could be worked out, and tried to do the best I could to find some way to get along temporarily, without the appropriation which had been defeated for purely political purposes. But under a plan for permanent government ownership railroad employees would run the risk of trouble on account of such playing of politics as was shown by the failure to pass this appropriation.

Some of you may say that according to the advice I am giving, the employees will get more money and better working conditicns from the railroad companies than from the government, and that this means that the government could operate the railroads more cheaply than the private corporations, because the government would pay less to the employees, and that this is inconsistent with the position that I have frequently taken in public addresses, that government operation would be more costly. But the two things are entirely consistent. I believe it is true, as my friend W. S. Carter so frequently said, that the employees would be worse off under government control. But I believe it is equally

true that the total cost of railroad operation under government control would be greater because there would be less private initiative, and for the same reason I believe the public service would not be so good.

My judgment, based upon my studies of this matter, considering the employees' interests while I was director general, leads me to conclude that the employees have far better chances to promote their interests under the plan we now have of private operation of railroads with the close government supervision. I think that by having intelligent labor organizations that will co-operate in good spirit with railroad management and by having what is equally necessary, and that is railroad management which will co-operate in good spirit with railroad labor organizations we will have a situation where the employees will have better pay and working conditions, and the public will have better service and at a lower cost.

I do not ask you to take my word for these matters. I ask you to think about them in a practical way and try to consider how you would be situated if the government were operating the railroads and all matters of wages and working conditions were things that you had to take up with the government before you could accomplish any results. But while I do not ask you to take my word, I do ask you to realize that I have tried to reach an honest opinion about this matter, based on careful and responsible study of the interests of the employees themselves.

Superfluous Train Accident Investigations

By B. B. A.

THE ABSURD AND WASTEFUL lost motion involved in the investigation of collisions and derailments on the railroads of the United States is an element in the public relations of railroads which might well engage the attention of all law makers; and of railroad officers also, though it is not clear what definite thing the railroads could do to remedy matters except to show up the confusing and costly conditions that so generally prevail. The situation is well illustrated in two recent derailments, one at Worcester, Mass., and the other in the Borough of Queens, New York City, reported in this issue. The situation calls for radical improvement.

Governmental investigation includes the activities of the Interstate Commerce Commission and of state commissions, the inquests of coroners and coroners' juries, and various police regulations. When suits are entered for damages the courts take a hand. In the New York case, the police arrested the two men responsible, on charges of manslaughter, and the court held them for trial in *twenty-five thousand dollars* each. In Massachusetts, the inquest, or what takes the place of an inquest, goes before the Superior Court for approval; and at Worcester, the judge of the court gave out five recommendations for the prevention of derailments, which are noticed below. (The judges of the courts, as a rule, confine themselves in railroad accident cases to as narrow a view as their duty, under the law, will admit of. The Worcester deliverance is rather exceptional.)

The Bureau of Safety of the Interstate Commerce Commission has had more experience in the study of safe train operation than any other public body, and logically should do all of this work on interstate railroads. The inspectors of the Bureau sometimes find, on visiting the scene of a train wreck, that their work is already cut out for them, and they encounter some queer situations. The railroad company itself starts an investigation, of course; and if the proper spirit is maintained, this is helpful all around. In some of the states the state commission is promptly on hand and perhaps is in the frame of mind of the states-rights congressman who, in the discussion in the House of Representatives prior to the passage of the federal accident inspection law, gave notice that, in *his* state, the state inspectors would always take precedence over the federal inspectors or there would be trouble. State commissioners' reports are of varying quality. The best ones usually parallel those of the federal inspectors, with few differences.

Local coroners make recommendations characterized by varied degrees of wisdom—or unwisdom. But it is in the State of Massachusetts that we find what is perhaps the most advanced and refined comprehensiveness in this field. Judge Jacob Asher's deliverance at Worcester goes into details almost like a patent specification. It is a credit to the author's humanity and thoroughgoing devotion to duty, if not to his engineering ability. The wreck was believed to be due to rocks on the track placed there in broad daylight by boys seven and six years of age. Judge Asher makes five recommendations. He says: "In view of the extreme youth of the children, I cannot find any cause for taking any criminal action. To reduce danger at the curves the radius of the curve should be increased and the right-of-way should be fenced." He also suggests the abolition of air brakes on pony trucks of locomotives, the numbering of pony trucks to aid in determining which set of wheels is derailed in an accident, and the placing of an electrical device on a pony truck so that when it becomes derailed information would be flashed to the engineer.

This is the report as it appears in the press dispatches. If railroads were to build fences along the right-of-way; if the fences were 10 ft. high, tight, and proof against the ambition of climbing boys, and were always kept in perfect repair, the conditions would, no doubt, be improved; and in many situations the fences would probably be economically justifiable. But the other four recommendations are so grotesque that one is led to query whether the Associated Press does a real public service when it broadcasts such a document to all the newspapers of the country.

The curve, which is in a rock cut, is not a bad one; about four degrees. It would be desirable, of course, to eliminate all curves, in every railroad; but in this case, the public, if thoroughly well informed, would probably vote 100 to 1 in favor of diverting the thousands necessary to improve the tracks to a more tangible improvement, such as abolishing grade crossings or building new passenger stations.

The use of brakes on front trucks (the report probably means four-wheel trucks, not pony trucks) may involve a theoretical risk, but at the high speeds now common with heavy trains, the advantage of having the use of the brakes in every-day service doubtless outweighs the worst possible chances of danger from their use. As to numbering the wheels, what additional satisfaction would have accrued in this case if the location of the wheels, as related to each other and to the rest of the engine, had been known? An electric apparatus in the cab for showing when a wheel was off the track would be interesting, and might be useful perhaps once in 50 or 100 years; but as in the case of rebuilding the tracks in the cut, the ultimate question is, What should a railroad buy with its surplus money?

In the Long Island City case the annoyance to the conservative citizen was in the manifestation of petty local political prejudice. The first public utterance was from the city government, whose main stock in trade, judging by the expressions of its chief spokesman, is animosity toward the capitalist, in any or every form; and the railroads are always treated as capitalists and nothing else. Denunciation of the railroad company, on general grounds, not specifically because of anything connected with the present wreck, was the principal message of the mayor to the citizens of New York. Next came the arrest of the man who threw the switch and the towerman who prematurely unlocked it, and the requirement by the court—many of the local courts seem to

be wholly in sympathy with the mayor—of bail bonds of $25,000 each. This figure evidently was intended to exemplify the official attitude, not toward the individuals accused, but toward the "interests"—the railroad company which was expected to give the bail bond. For a crime likely to be classed as murder, this sum might be appropriate; but judging the acts of the men in the present case as they are reported, the worst possible legal construction that could be put on the offenses would probably be the lightest degree of manslaughter.

The State Rapid Transit Commission issued a temperately worded report calling for remedies entirely reasonable from an engineering standpoint; and the next outburst was from the prosecuting county attorney (whose function it would be to try the two individuals who were arrested) in a childish complaint that the Transit Commission had impaired the strength of his case by premature publication of its opinion. No specifications were given as ground for this complaint; probably because no real grounds exist. A proposed grand jury investigation is yet to be held.

Unless our centralized government shall become still more centralized, the local police power will remain the approved primary means of dealing with cases of homicide, everywhere throughout the United States; and also in a large degree with occurrences less serious than homicide, but which intimately affect the everyday life of the masses of the people. Any such thing as modifying the statutory laws concerning accident investigation is, therefore, doubtless, out of the question. But it remains true that wise, temperate and far-seeing recommendations concerning remedies or improvements can be expected only from men who by long experience and education have become specialists in this subject; and that the public should not waste its time in reading or considering the opinions of men less thoroughly qualified to form opinions. And, judging by past experience, it is reasonable to say that, as a rule, a state inspector of railroad accidents is a superfluous functionary; the federal government should cover the whole field. This is said, not from any lack of sympathy with "states rights" or of respect for numerous state engineers; it is simply a conclusion based on a review of the investigations of train accidents which have been made during the past dozen years. The railroads of the United States may be considered, for our present purpose, as one great homogeneous system. The lessons to be derived from collisions or derailments are a good deal alike all over the country, and the need of publishing such lessons may be considered as being the same in Maine as in California, and everywhere else. To be an expert in the art of educating the public in the field here considered, one needs to have a good body of experience and, as a practical matter, it is only by constantly surveying the whole field—the whole country—that any individual gets that essential experience. No one state has a sufficient number of accidents to afford the necessary background. The correction of the evils or deficiencies which cause "accidents" depends not alone on the publication of a report embodying sound views and conclusions, but also on a suitably receptive mind on the part of the person or persons whose duty it is to see that effective corrective measures are carried out; and to secure this condition it is usually necessary that the accident which is reported on shall be a prominent one. What may be called commonplace train accidents are so numerous that reports on them are pretty sure to fall short of influencing anyone to effective action. To secure adequate attention to such reports seems to be impossible.

The Bureau of Safety of the Interstate Commerce Commission, surveying the whole country, and picking out only the most notable examples, is the only public body which has had much success in securing adequate publicity in the past, and it would be in the best interest of the public if everybody were to look exclusively to that bureau for effective work in the future. That bureau has its drawbacks, notably the drawback of an insufficient force of competent inspectors, ready to attend to all investigations with the necessary promptness and comprehensiveness. Also, the arrangements for getting its reports actually into the minds of the people are far from satisfactory. If public opinion is ever going to rise to the point of demanding (and supporting) the highest possible degree of safety on the railroads, leading citizens must be convinced of the facts of the situation, as fully as they were convinced by the radio, last month, that the Democrats of Alabama had cast 24 votes for Senator Underwood. Certain questions of detail may require time for their settlement, but that a single investigating body for the whole country is a chief desideratum will be apparent to anyone who examines the subject in all of its ramifications.

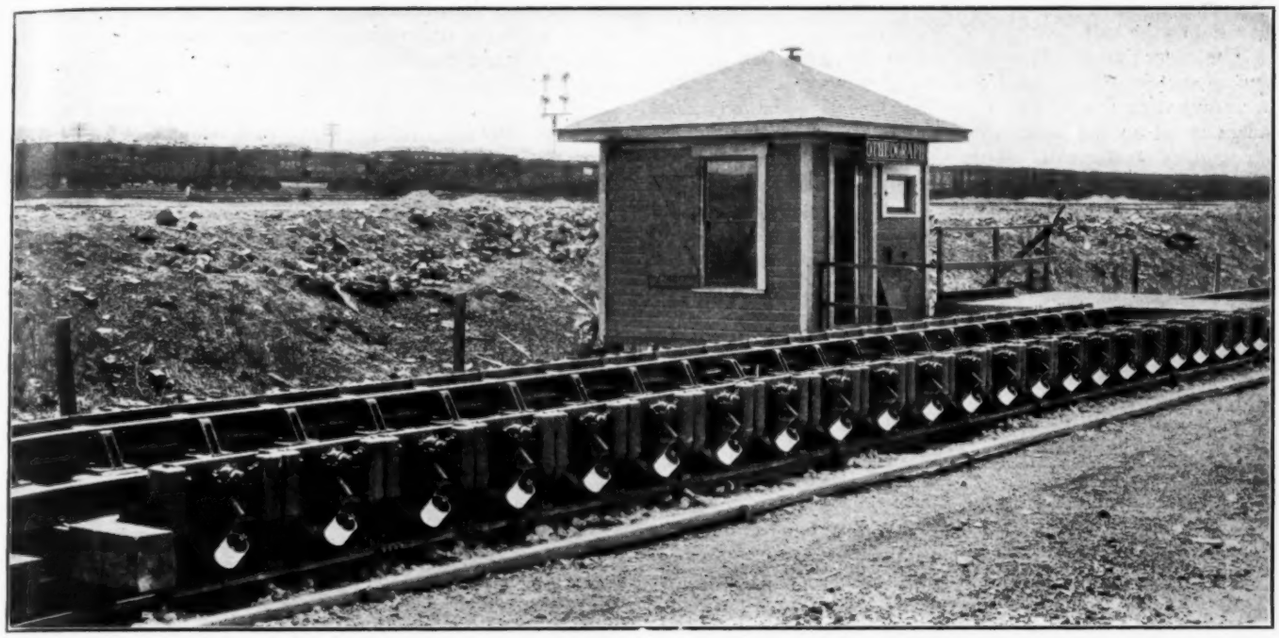
Derailment at Worcester, Mass.

THE DIRECTOR of the Bureau of Safety, Interstate Commerce Commission, has sent to the commission a report on the derailment of train No. 59, of the Boston & Albany near Worcester, Mass., on June 3, when three men on the locomotive were killed and 30 passengers and one employee were injured. Train No. 59, a westbound express, moving at about 35 miles an hour or faster, was derailed on a curve of 4 deg. and the locomotive was overturned. Two small boys, six years and four years of age, confessed to having put stones on the track, and an investigator on the part of the state authorities reported the derailment as due to this cause; but Mr. Borland's report says that "it is believed to have been caused by excessive speed and irregular superelevation, possibly superinduced by striking small stones which had been placed on the track." The line at this point is through a rock cut, 18 ft. deep, and the curve for a distance of a quarter mile varies from 1 deg. 44 min. to 5 deg. 15 min. and the superelevation is also variable. The derailment occurred at a frog where the superelevation varied, in the length of two rails, about seven-eighths of an inch. This part of the railroad was built in 1833 and the inspector concludes from the irregularity of the curve that it is difficult to maintain proper elevation and at the same time provide proper clearances. At one point on the inside of the curve loaded freight cars appear to have scraped the ledge. The presence of stagnant water in the ditches, although it is at a summit, is held to indicate a lack of efficient drainage.

On August 8, 1922, following a derailment at this same place, and under similar circumstances and because of the difficulty of keeping the track in good condition, the speed of trains through the cut was permanently limited to 35 miles an hour, at all times; but the conclusion of the inspector is that on June 3 this limit was no doubt exceeded.

The report observes that the right-of-way at this point is used as a dumping ground by people living nearby, and the erection of a suitable fence is recommended. A fence also "would prevent the use of the railroad property as a public highway."

In the Superior Court, at Worcester (the county seat), on August 2, Judge Jacob Asher, approving the report which had been made to the court on the derailment of Boston & Albany train No. 59, on June 3, announced that in view of the extreme youth of the boys who had been held for placing stones on the track, he should take no criminal action; and he recommended (1) that the curve should be reconstructed, of larger radius; (2) that the right-of-way be fenced; (3) that air brakes should not be used on pony trucks of locomotives; (4) that pony trucks should be numbered so that in case of derailment it would be possible to determine which pair of wheels was first to run off, and (5) that on the pony truck there should be an electrical device to inform the engineman if the truck should jump the track.



Otheograph Installation on Erie Test Track Showing 23 Fully Equipped Ties

Ortheograph Records Locomotive Characteristics

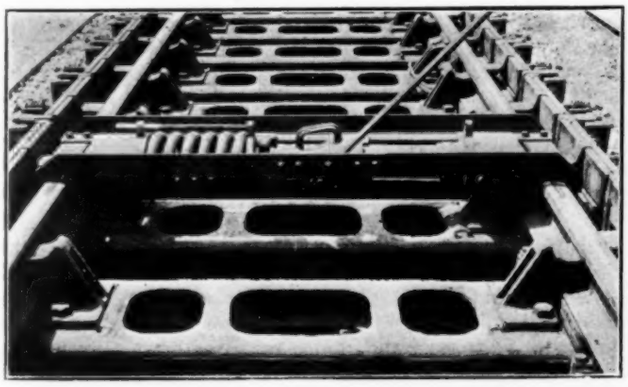
Use of Device Properly Calibrated Gives Accurate Determination of Tracking Qualities of Equipment

By P. M. Gillilan

Railway Engineering Department, General Electric Company, Schenectady, N. Y.

THE OTHEOGRAPH consists of one or more steel ties with indicators on each end which record the reaction of locomotives and cars on the track and shows the impulse of each wheel on the ends of every tie. It shows the following on a graphic record:

The amplitude and characteristics of both the vertical and transverse flange thrusts of all the wheels on each rail.



Calibrating Device Used for the Calibration of Lateral Springs

The running equalization and rolling characteristic of the locomotive and cars. This has never been shown before on any device.

The comparative vertical and lateral flange thrusts at different speeds.

When installed in the main line it may be arranged to show the loading of every wheel, even in a long train.

It detects flat spots on wheels and shows on which wheel they exist.

It indicates any transfer of weight or tilting in the locomotive driving trucks and the extent of the transfer.

Description

Each otheograph tie consists of three principal parts which are the steel tie casting, the bottom and side springs, and the recording heads.

The tie casting for a standard 4-ft. 8½-in. track gage is 6 ft. 10 in. long and is the foundation to which the various parts are fastened. It is designed for strength and rigidity and yet is made as light as possible. To this cast-steel tie are fastened the supports for the bottom springs, the stops for holding the rails in place and a cross bar at each end which supports the recording heads. The tie turns up at the end and is machined to hold the side springs in place.

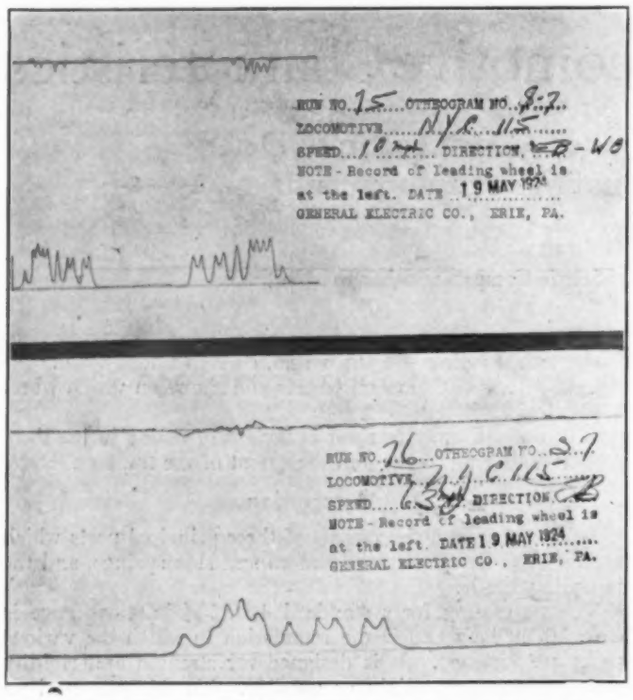
The main springs are flat, specially machined, tempered and ground. The pressure is applied at the center of the springs. The latter are uniformly one inch thick and rest on supports 20 in. apart which makes them a beam of uniform section supported at the ends with a concentrated load at the center.

The maximum deflection of these springs is limited to ⅛ in. at the center. With a 100-lb. rail, two springs are placed under each rail and two set on edge in the end of the tie and opposite the head of each rail. The bottom springs are 6 in. wide and the side springs 4½ in. wide. Spacers are placed between each pair of springs at each end and at

the center. Both sets of springs lie with their long axes parallel to the rail.

The recording heads are bolted to the cross bar on each end of the tie. Each head consists of a main frame casting, recording drum and two recording levers. The recording drum is set on the lower part of the casting at an angle of 45 degrees to the rail. This arrangement permits the two recording arms to operate on the same drum. The drum is revolved by a flexible wire cord wound in a groove around the base. The torque exerted is counterbalanced by a coil spring inside the cylinder which causes the drum to return when the tension is relieved. Two clips are hinged to the bottom casting of the drum to hold the recording paper. The drum is a brass cylinder, 4 in. long and 4 in. in diameter.

The two recording levers in each head casting are alike. The upper lever records the lateral, and the lower the vertical movement of the rail. Each consists of three principal parts, short radius arm, long radius arm and stylus arm. The short radius arm with a cam fastened to it is part of a machine piece about which the recording lever rotates. The long radius arm is made of very light steel tubing, copper plated, and is brazed to the machined piece. The aluminum stylus arm is hinged to the end of this long arm. Between the cam on the short radius arm and the side spring in an adjustable distance piece which transmits the movement from the center of the spring and rail to the recording arm. The cam rolls on the flat hardened steel surface of the distance

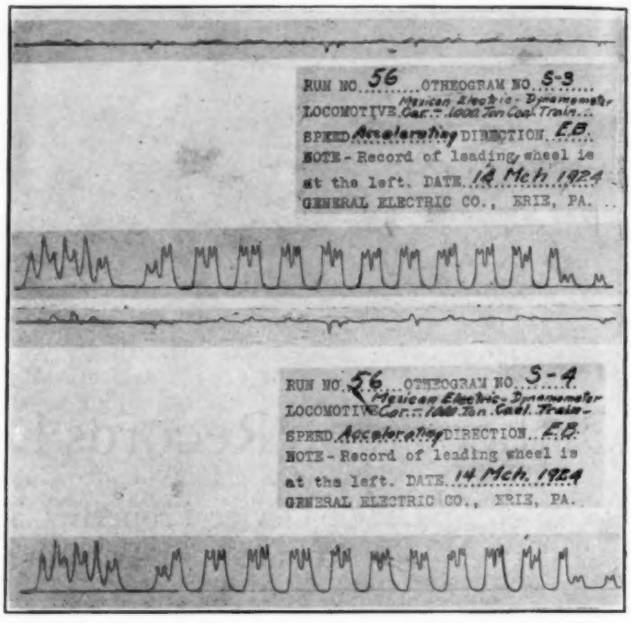


Otheogram, Showing Records Obtained by a Mikado Locomotive and Train Running at 10 and 63 Miles Per Hour

piece and is designed to give a compensating radius to the short arm in order that the multiplied record on the paper will be maintained constant. The arm is built to give a ratio of eight to one. In order to set the stylus for the zero line on the record, the distance piece is made adjustable. The short radius arm is held tight against the distance piece by a retriever spring, which may be set to the proper pressure by an adjusting screw. The spring pressure is so slight that the opposing effect on the main side springs is negligible.

The aluminum stylus arm carries a small brass stylus pin which is held in contact with the record paper by the action of two springs. One is a coil tension spring which holds the arm against the drum and the other a flat cantilever spring which holds the stylus pin at the proper pressure on the paper. The stylus pin is guided by a hardened steel bushing set in the aluminum arm. The end of the bushing next to the paper is polished so that it can rub on the record without tearing. Metallic coated paper, 4 in. wide and 16 in. long is used for the records. This paper shows a good distinct black mark when the brass stylus passes over it. It shows marks of brass, copper, silver, nickel, etc., but is not affected by steel.

When changing the records after a test run, the stylus arms can be folded back out of the way. These arms main-



Otheogram, Showing Records Obtained by a Locomotive, Dynamometer Car, 1,000 Ton Train and Caboose Passing Over Test Track

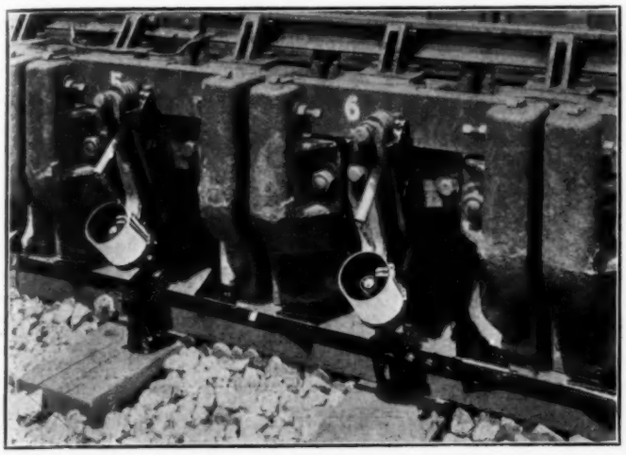
tain a position nearly parallel to the long radius arm and are held there by the same coiled spring which holds them against the recording arm.

Installation

Otheograph ties may be installed in either curved or tangent track with a minimum spacing of 24 inches. There is no limit to the number of ties which may be installed, although installations of from one to a group of 25 have been made. Each tie is located immediately over a wooden tie and particular attention is given to the installation to obtain the same type of supporting roadbed as elsewhere, so that no unusual track conditions will be imposed upon the locomotives which pass over the otheograph. A cut is made in the subgrade of sufficient depth to allow for a ballast depth equal to that of other similar parts of the track. Above the wooden ties laid on this ballast, are placed thin longitudinal wooden stringers of no appreciable vertical stiffness. These stringers retain the alinement of the otheograph and are placed in line with each rail, and under the ends of the otheograph tie. To adjust for any settling of the roadbed, wedges are put under each end of the tie and above the longitudinal stringers. The adjustment of these wedges keeps the fulcrum of the bottom springs in proper contact with the bottom of the rail.

The rails are held in position by stops on the inside of each rail. These stops hold the rail through toggles which fit the rail on one end and are recessed in the stops on the other end to give freedom of motion to the rail and yet hold

it securely. The rail is similarly held on the outside by toggles, with the exception that they are recessed into the fulcrum plates on the side springs. At the track joint this same principle is employed with a slight difference to accommodate the splice bar. The side springs are supported at the



Otheograph Installation on Erie Test Track, Showing the Ends of Two Ties and Side Rods for Driving the Recording Drums

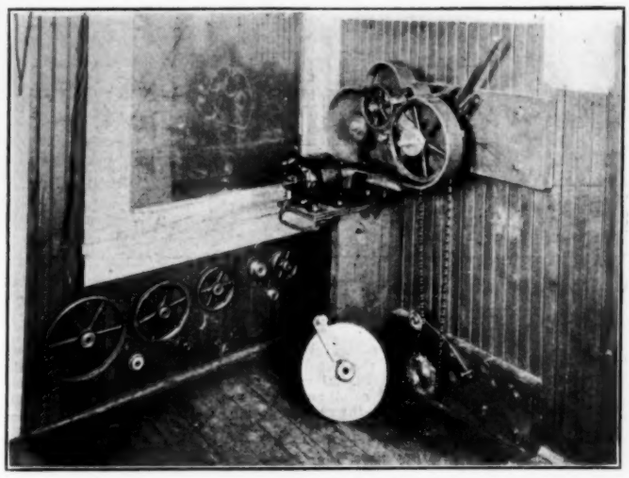
ends by tapered wedges which also serve to adjust the track to proper gage.

Driving Mechanism

Along the ends of the otheograph ties and on each side of the track is installed a rectangular bar to which the wire cord from the recording drum is fastened. The operating bar extends the full distance of the otheograph and its length depends upon the number of ties. It is supported every fifth tie by roller brackets fastened to the wooden ties. Rack teeth are cut in the end of the operating bar which engage with a pinion driven by gears. The gears are driven from a motor operated mechanism at the side of the roadbed, through a shaft at right angles to the track and running underneath the rails. When the otheograph is operated, the driving bar on the side of the motor mechanism is moved toward the gears and the bar on the opposite side is geared to move in the opposite direction, in order to give uniform records for both sides of the track. The rack portion of the driving bar, which is 12 in. long, is undercut at the end so that the gear can run off and the bar cannot overtravel. The rack teeth reengage when the drive is released due to the recoil springs in the recording drums. The drive shaft is provided at the motor end with a chain sprocket which connects with a sprocket on the clutch of the motor mechanism.

The operating mechanism is a self contained motor driven train of reduction gears and is independent of the speed of the locomotive. This constant speed drive makes a record with a constant abscissa so that the peaks of the curves are proportional to the actual distance between the wheels of the locomotive. A constant speed fractional horsepower motor, either direct or alternating current, drives the mechanism. The speed is varied by change gears.

A hand wheel is also available to drive the otheograph in case of loss of motor power. A hand drive can be furnished instead of the motor mechanism. This latter is not entirely satisfactory as the hand drive is not always steady and the records produced do not have a constant abscissa.

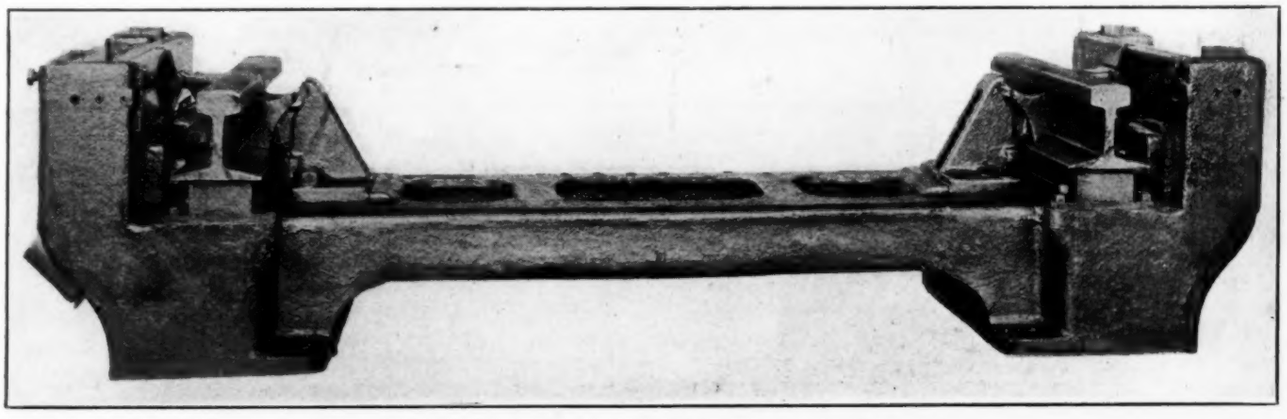


Otheograph Driving Mechanism, Showing Motor Driven Gears, Spare Change Gears and Emergency Disc for Hand Drive

Records

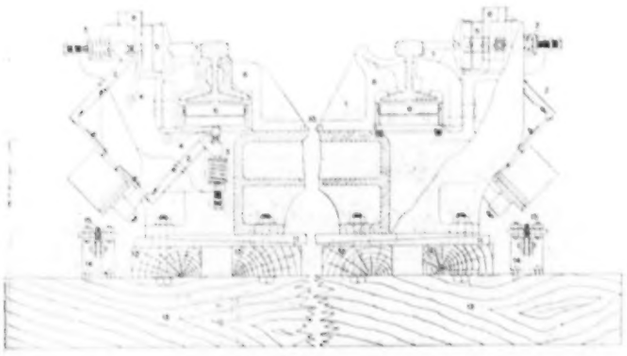
The otheograph records show the comparative effect on the rails for each wheel, equalization of axle weights, and lateral thrusts which give an indication of the tracking qualities. The slope of the impact peaks gives the rate of speed of the blow on the rail. The records also indicate the dynamic augment when comparing an engine at slow speed with the higher speed record.

A full set of otheograms is made when the locomotive or train passes over the otheograph. On each side of the track the successive otheograms show the impulse of the



Side View, Showing Location of Rails and Operating Mechanism

wheels on the rail at each tie. The lower curve of each record shows the vertical pressure of the wheels. The upper curve shows the lateral or flange thrusts of the train wheels. The part of this curve above the datum line is due to stressing the rail when the wheel is shifted toward the center of the track and has no calibration value. The upper and lower curves register together so that the lateral effect of a wheel is directly opposite the corresponding vertical impulse. The record of the leading wheel of the train is always at the left end of the otheogram. This is independent of the direction of the train movement over the otheograph.



Otheograph Tie Outline, Showing Joint and Straight Rail Cross Sections with Supporting Timbers

1—Recording drum; 2—Recording lever; 3—Retriever spring for recording lever; 4—Adjustable distance piece between recording lever cam and side spring; 5—Side springs for horizontal thrust; 6—Bottom springs for vertical thrust; 7—Toggle between rail head and side springs; 8—Inside stop which holds the rail in position; 9—Supporting wedges for side springs; 10—Tapered wedges for side springs; 11—Wedges for adjusting height of tie; 12—Longitudinal wooden stringers; 13—Supporting crosstie; 14—Roller bracket supporting operating bar; 15—Operating bar.

The record from a slowly moving locomotive shows the equalized distribution of the weight and serves as the basis of comparison with a record taken at a higher speed. The effect of side thrust in changing the vertical component of the locomotive and any variation due to dynamic unbalance is definitely indicated. Every impulse of the wheels on the rail appears on the otheograms, even the effect of a flat spot on a wheel or any slight uneveness in the matching of the rail joints.

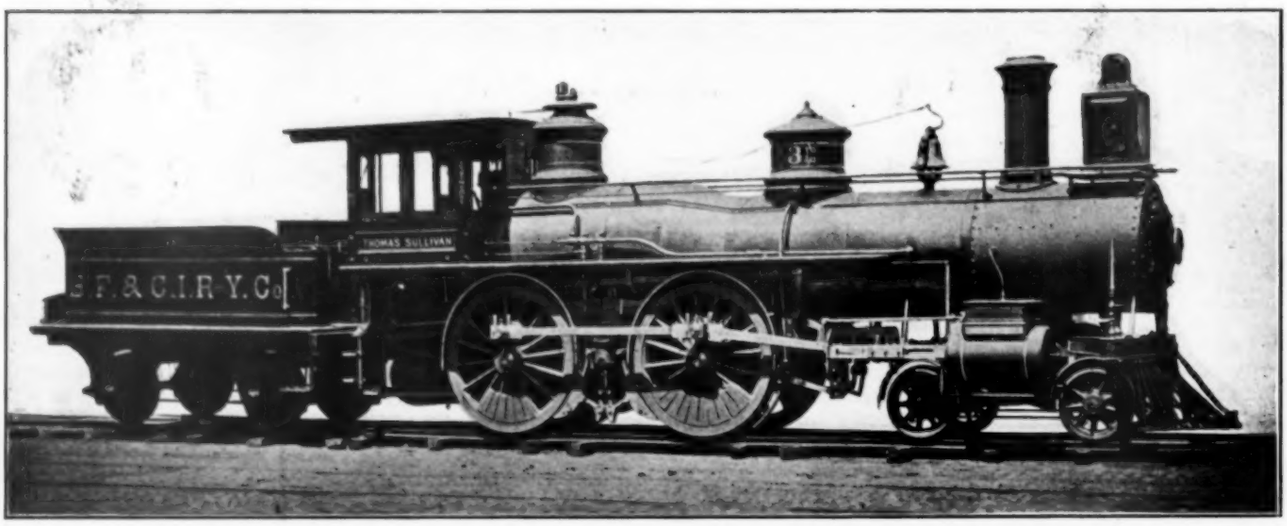
Calibration

The calibration of the lateral springs is made with a device especially designed for the purpose. It consists of a calibrated spring of 7½ tons capacity mounted in a rigid frame with a ratchet jack. The calibrating device is set across the track and between the rails opposite the center of the side springs. Recording papers are put on the drums at each end to indicate the movement of the rails as they are spread by the jack and spring. The pressure on the rails is known from the amount the calibrated spring is compressed. This pressure compared with the stylus movement on the record gives a direct calibration to the lateral thrust curves.

The value of the ordinates of the vertical pressure curve is obtained by rolling the locomotive of known axle weight slowly over the otheograph. The peaks of the curve then correspond to the actual locomotive wheel weights. These values are then directly proportional to the increased values which may appear by running the locomotive at higher speeds. These slow speed ordinate values are generally applicable to other locomotives with similar wheel distribution. A locomotive or car with radically different wheel distribution must be run slowly over the track in order to obtain a new calibration value. The average calibration value of the lateral thrust curve is 32,000 lb. to the inch while the vertical pressure curve has an approximate value of 50,000 lb. to the inch. This latter value applies to the load on any one wheel and is equivalent to an axle load of 100,000 pounds.

An installation of otheograph ties should consist of at least eight ties on either curved or straight track. This number of ties will accommodate the revolution of a 60 in. locomotive driving wheel and show its action in the various angular positions. If locomotives with 72 in. driving wheels are to be tested, the installation should be increased to ten ties. One of the ties should be equipped for a track joint on one end, if it is desired to show the action of the track at the splice bar. With staggered track joints it will be possible to install eight ties between joints and thereby eliminate the special fittings.

Otheograph ties are made for standard gage and 100-pound rails but they can be made for special track gages and lighter rails with little change. The scheme and design is so simple that changes to meet special track conditions can be made with but a slight change in cost.



Locomotive Which Used to Handle Passenger Trains Between Brooklyn, N. Y., and Coney Island

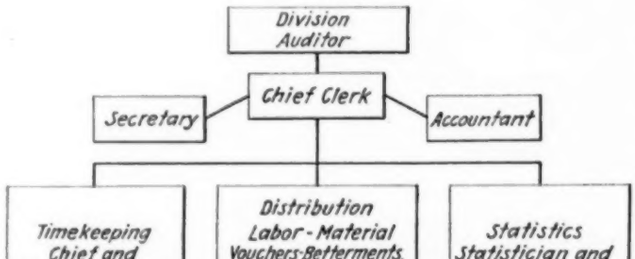
Division Disbursement Accounting on S. A. L.

Method Facilitates Accounting, Preparation of Operating Statistics and Special Studies

By L. L. Knight
General Auditor, Seaboard Air Line

THE INAUGURATION of division accounting on the Seaboard Air Line was a result of an increasing concentration of all accounting and preparation of statistics in the accounting department.

The reorganization of forces and the changes in disbursement accounting methods occasioned thereby were preceded by the transfer on March 1, 1920, to the jurisdiction of the accounting department of the accounting and statistical forces of the superintendent motive power, general purchasing agent, shop superintendents, master car builder, master mechanics, division engineers, division superintendents and general and division storekeepers. Gradually as conditions permitted, other accounting and statistical forces were likewise transferred until all disbursement accounting, and statistical work is now performed in the office of the auditor dis-



Organization Chart of Division Auditor's Office. Staff of Offices Ranges in Number from 13 to 20 Employees; Average 18

bursements, division auditors, general shop and stores accountant and by the accountant in the office of the superintendent dining cars.

There are seven operating divisions, each with a division auditor's office located at division headquarters. The division auditor, although appointed by and responsible to the auditor disbursements, serves on the superintendent's staff, ranking with the trainmaster, division engineer, and master mechanic. The general shop and stores accountant is at Portsmouth, Va., where the principal shops and the general store are located. His rank is the same as that of a division auditor.

Important Features of Plan

Some of the important features of the Seaboard's comprehensive division accounting are as follows:

1. All disbursements arising in connection with operation, maintenance and additions and betterments are given final auditing on the division.
2. Pay checks for division rolls, after counter-signature by the division auditor, are delivered by division paymaster prior to dispatch of the payrolls to the general office for final review.
3. As an aid to budgetary control, transportation and maintenance of equipment expenditures are taken up *on a daily basis* and maintenance of way on a weekly basis, division officers concerned being advised in detail within five days the expenditures incurred for a given day or period so subdivided that individual subordinates may be judged on their performances.
4. General officers are advised two days later by the auditor disbursements of the combined expenditures for the system; expenditures for the month furnished eight days after the close of the month are practically accurate and serve the management for all preliminary purposes.
5. Engine, car, train tonnage and fuel statistics are compiled in division auditors' offices from conductor's wheel reports and dispatchers' daily train sheets. The division superintendents are advised daily within four days of date the train performances, including gross and net ton miles by district and train runs (in such detail as to enable operating officers to detect promptly any operations reflected thereby which are not economical) and loaded and empty car miles as well as other important related statistics compared with important items of operating expenses, such as wages divided between straight time and overtime, and fuel consumption.
6. While under the old centralized method of disbursement accounting numerous suspense items were carried over without adjustment from month to month because of lack of information —which in many cases had to be obtained through extended correspondence—the division auditor now controls all division suspense accounts, and through his direct contact with responsible officers on the division is able with a minimum of correspondence to keep his accounts clear of all such items.
7. Each division renders monthly, by primary and subprimary accounts, a statement of expenditures incurred in the operation of the division, it being only necessary for the auditor disbursements to summarize these division reports in issuing the system report of operations.
8. The variety and scope of work performed in the division auditors' offices have prompted *the use of tabulating machines and other labor-saving machines in each of the division offices* at a substantial saving to the company.

Office Manual Facilitates Uniformity

The nature of the work in all division offices is similar and it was recognized that uniform methods should be prescribed. To meet this need, an office manual of instruction was prepared in loose-leaf book form and has been in use since July 1, 1921. A number of supplements have been issued to provide for changes in reports and to some extent in methods. The office manual has been of very great benefit. At the present time, the manual and effective supplements are undergoing a careful revision.

Each Divisional Organization a Complete Unit

Each divisional accounting organization is a complete unit. Its jurisdiction extends to and covers all transactions of the maintenance of way, maintenance of equipment and transportation departments of the operating division. In addition full responsibility for the correct accounting distribution covering store stock materials used and released and stock accounting for unapplied maintenance of way materials, including roadway materials, rail and ties, rests with it. All cost and statistical reports relating to division performance are prepared in and analyzed by the division auditors' offices.

Stores Accounting

The accounting jurisdiction of the general shop and stores accountant extends to the stock accounts of the general storekeeper and division storekeepers. The division auditors have no control over the stock accounts of the division storekeepers; they merely credit the storekeepers with the daily invoices of materials disbursed and charge them daily with the credit invoices covering materials released and taken back into store stock. The general storekeeper and the division store-

keepers render summaries of disbursements and receipts as a basis for entries in the accounts of general shop and stores accountant. All invoices for incoming shipments, when vouchered, are transmitted to the general shop and stores accountant by the general storekeeper for verification against the records and for audit separately from other vouchers in "supply department" series. The treasurer's abstracts of "supply vouchers" paid are received daily by the general shop and stores accountant who keeps the details of the account. Collection vouchers are similarly handled, except that collections are made by the auditor disbursements. The general shop and stores accountant has accounting jurisdiction over all work done in the Portsmouth general shops and is responsible for the preparation of completion reports covering all additions to or changes in rolling stock for the entire system. Sub-foremen in the Portsmouth general shops render daily reports showing a distribution by classes of work of the time of shop employees. These reports are used as a basis for payroll distribution and preparation of statistical and cost statements.

Office of the Auditor Disbursements

In organizing division auditors' offices, it was necessary to reorganize the office of the auditor disbursements. In this reorganization many positions were abolished and others changed to meet the changes in auditing procedure. The reorganized office, except for bureaus handling car repair bills and vouchers, fuel and claim accounts, and a small unit for the handling of transactions of departments—whose accounts are not referred to in the foregoing—consists of forces engaged in work similar in nature to that enumerated as follows:

Summarizing division condensed statements of accounts, statistics, etc., and issuing system reports.

Handling for final approval of payrolls and vouchers after audit by the divisions—audit numbers applied by division forces are assigned each office monthly in advance.

Posting payments and cancellation of vouchers, bills and pay checks, and drawing off details of these and similar balance sheet accounts.

Final checking and acceptance of authorities and completion reports covering changes in physical property, the preparation of and initial accounting for same being handled by division forces.

Work of a general nature, such as ascertaining if capital expenditures are approved by the board, executive committee, or proper executive officers.

Each Division Has Complete Record

It is necessary to state maintenance and transportation expenses separately for each operating division. The physical make-up of the seven divisions is such that, except for the use of the same shops, roundhouses, yards and other terminal facilities at points where divisions join, each division constitutes a separate operating unit. Except for so-called "common terminal transportation expenses" (referred to above and included in accounts 373 and 376 to 389 and 400) which are impracticable of apportionment, all primary maintenance and transportation accounts are allocated or apportioned upon specifically prescribed bases to the divisions benefited. A few of the accounts, among which are Nos. 314, 317, 326, 371 and 402, are treated as "pool" accounts and apportioned in a lump upon a mileage or other appropriate basis. Apportionments are made in time to have department bills therefor reach the divisions for inclusion in the month's audited accounts.

Fuel Accounts

In the adoption of the existing divisional accounting system, especial care was exercised to prescribe, when practicable, the "direct charge" system and to restrict what may be termed the "open account" system. The division expenditures are so stated in the accounts as to permit of easy identification of all entries included therein.

A sub-bureau composed of three clerks is maintained in the auditor disbursements' office for the control of fuel accounts. The division auditors receive with individual issue tickets daily reports in duplicate from each coaling station, which after being given proper check are entered in division record of fuel station issues. To the tonnage so reported is applied, for the purpose of ascertaining transportation and other costs, the rate per ton which is furnished in advance by the fuel accounting bureau. One copy of the daily fuel report from each station is approved and mailed by the division auditor to the fuel accounting bureau. At the end of the month the division auditor credits "fuel account" of the auditor disbursements and charges operating or other appropriate accounts with all issues of fuel to locomotives, shops, water stations, etc. In addition to using these daily coaling station reports for purposes described above, division auditors prepare therefrom semi-monthly statements by the use of tabulating machines, showing consumption of fuel for each locomotive in each class of service with comparisons, using averages for engines in freight service based on pounds consumed per 1,000 gross ton-miles and for engines in passenger service based on pounds consumed per passenger car-mile and per locomotive-mile.

Accumulation of Expenditures Report

All transactions which are applicable to a division are audited on that division, leaving comparatively few transactions related to or affecting maintenance and transportation to be taken up by the accounting bureau in the auditor disbursements' office. There are ten "accumulation of expenditures" reports prepared—one each by the division auditors, the general shop and stores accountant, the accountant located in the office of the superintendent dining cars and the auditor disbursements. On these forms are printed in the first column the numbers and titles of all accounts commonly used; the other columns across the form are headed:

Register of Expense Vouchers.
Register of Accruals for Delayed Bills.
Register of Payrolls.
Register of Department Bills Received.
Register of Store Bills Received.
Register of Debit Adjustments.
Total Debit Registers.
Register of Collection Vouchers.
Register of Accruals for Delayod Collections.
Register of Department Bills Rendered.
Register of Store Bills Rendered.
Register of Credit Adjustments.
Total Credit Registers.
Net Debit.
Net Credit.

The registers are all uniform in size (17 in. by 14 in.) and are prepared in duplicate. The originals, with recapitulations and condensing sheets, are sent to the auditor disbursements at the close of the month's accounts. The registers are consolidated into the "accumulation" statement and covered by a journal voucher the ten journal vouchers comprise the disbursement general journal. A recapitulation of these "accumulation" statements gives the system figures by primary and subprimary accounts.

Monthly General Balance Sheet

The division accounts are kept under control through a monthly general balance sheet rendered by each office. All division auditors' accounts are cleared to the general office each month, except such balances as are carried over in the following balance sheet accounts:

Account 705. Miscellaneous Physical Property—Leased Rail and Material.
Account 715. Miscellaneous Accounts Receivable—Uniform Accounts.
Account 716. Material and Supplies—Roadway Materials.
Account 716. Material and Supplies—Cross Ties.
Account 716. Material and Supplies—Rail.
Account 719. Other Current Assets—Outside Parties.
Account 727. Other Unadjusted Debits—Shop Orders.
Account 727. Other Unadjusted Debits—Accruals for Delayed Collections.
Account 778. Other Unadjusted Credits—Accruals for Delayed Bills.
Account 778. Other Unadjusted Credits—Side Track Deposits.
Account 778. Other Unadjusted Credits—Reserve for Replacement of Property.

The accounts of the general shop and stores accountant are similarly cleared, except such balances as are carried over in the following accounts:

Account 716. Materials and Supplies—Stores.
Account 716. Materials and Supplies—Stationery.
Account 716. Materials and Supplies—Old Material.
Account 716. Materials and Supplies—Scrap in Transit.
Account 719. Other Current Assets—Outside Parties.
Account 727. Other Unadjusted Debits—Freight on Company's Material.
Account 727. Other Unadjusted Debits—Equipment Set Aside for Disposition.
Account 727. Other Unadjusted Debits—Material Orders.
Account 727. Other Unadjusted Debits—Accruals for Delayed Collections.
Account 760. Audited Accounts and Wages Payable—Audited Supply Vouchers.
Account 778. Other Unadjusted Credits—Accruals for Delayed Bills.
Account 778. Other Unadjusted Credits—Reserve for Replacement of Property.

When it is necessary to initiate transactions affecting any of the above in the general office accounts—such as cash deposits made to protect applicant's proportion of cost of an industrial track—clearing account "other divisions" is credited, and that account is cleared by department bill rendered against the appropriate division.

Prompt Payment of Wages by Division Paymasters

There was published in the *Railway Age* of December 17, 1920, an article describing the Seaboard "division pay" system. Except for general offices and the on-and off-line traffic forces, all payrolls are prepared on the divisions and, after proper audit by the division auditor, are passed to the division paymaster who issues pay checks to cover, after

8-15-21—1M

SEABOARD AIR LINE RAILWAY COMPANY

Form 2254

Balance Sheet of _____ Division Month of _____ 192__

DIVISION CONTROL, GENERAL LEDGER AND CLEARING ACCOUNTS

DEBITS					CREDITS
705 Leased rail material—balance from previous month.					705 Leased rail and material—balance at close of month.
715 Uniform account (S. A. L.) balance from previous month.					715 Uniform account (S. A. L.) balance at close of month.
716 Stock of cross ties—balance from previous month.					716 Stock of cross ties—balance at close of month.
716 Stock of rail—balance from previous month.					716 Stock of rail —balance at close of month.
716 Stock of roadway material—balance from previous month.					716 Stock of roadway material—balance at close of month.
716 Stores—balance from previous month.					716 Stores—balance at close of month.
TOTAL					TOTAL
ACCOUNTS CLEARED TO GENERAL OFFICE ACCOUNTS					
Investment in Road and Equipment.					Investment in Road and Equipment.
Operating Revenues.					Operating Revenues.
Operating Expenses.					Operating Expenses.
Income Accounts.					Income Accounts.
510 Miscellaneous Rent Income—Expenses.					503 Hire of Freight Train Cars, Cr.
511 Misc. Non. Operating Physical Property Exp.					504 Rent from Locomotives.
533 Uncollectible Railway Revenues.					505 Rent from Passenger Train Cars.
536 Hire of Freight Train Cars Dr.					506 Rent from Floating Equipment.
778 Delayed Payrolls.					778 Delayed Payrolls.
					Net Clearance to General Office Accounts.
TOTAL					

Division Auditor.

Form 2254

which the payrolls and checks are returned to the division auditor who validates the checks by counter-signing for the accounting department. The payrolls with the pay checks are then turned back to the division paymaster who effects delivery of the pay checks.

Direct Mailing of Bills Expedites Collections

We have found it practicable to permit the division auditors to mail collection vouchers directly to the debtor. This procedure has a tendency to expedite collections.

Procedure with Clearing Accounts

Several examples are here given to illustrate the extent to which expenditures are localized for direct charge or clearance by the division auditor:

Clearing account "Store expense," being local to each point, of each division, made up of local store expense arising in the division accounts, together with apportionment from general and other stores by general shop and stores accountant, is on basis of store issues.

Clearing account "Stationery store expense" applicable to stationery issues of each division, made up of apportionment by general shop and stores accountant, is cleared on basis of the issues from stationery store.

Clearing account "Shop expense," being local to each point, clearance is made by each division auditor on basis of direct payroll charges to accounts benefited.

All expenses and revenues in connection with joint facilities operated by the Seaboard are charged or credited to clearing account "Joint facilities." Each facility is designated by a number and charges covering work performed by maintenance of way and other forces in connection with the operation of a joint facility is identified by the number assigned to the facility against which the charge is made. With the detailed charges and credits completed for a month, the posted ledger sheets are cleared by entry, the details thereof affording basis for bills against debtors.

Charges and credits in the accounts of one division which are applicable to another division are made to clearance account "Other divisions," which account is cleared through the medium of department bills.

Charges and credits in connection with authorities for expenditures are made to each authority through clearing account "Betterments," which account is cleared at the end of each month by an adjustment entry.

The totals of payrolls ("Amount earned" column of payroll), as entered in the register of payrolls, are credited to clearing account "Payrolls," clearance being made by the division auditor's "Payroll clearance" adjustment, prepared upon the basis of completed payrolls after deductions on orders have been protected and pay checks for the remainder written and turned over to division paymasters for delivery. Division auditors handle deduction lists, make settlements and conduct correspondence in regard to insurance, commissary and other deduction lists.

Budget Control

On or about the first of the month, the maintenance of way and maintenance of equipment departments are allotted specified sums within which must be held the month's expenditures. These appropriations, made on the basis of an approved budget, are apportioned to the division officers and in turn these division appropriations are given out for maintenance of way by roadmaster and master carpenter districts, and for maintenance of equipment by local and division shops. At the monthly "expense meetings" which the division

superintendents and division auditors attend, the maintenance of way and maintenance of equipment budgets are discussed in general and more particularly the forecasts made by each superintendent of transportation expenses for the ensuing month. The importance of having each division live within its appropriation for the maintenance and transportation departments is continually being impressed upon division officers.

Maintenance of equipment and transportation expenses are taken up by division forces on a daily basis, while maintenance of way expenses are taken into the accounts periodically, or four times a month. The only reason for handling maintenance of way expenses periodically rather than daily is the majority of maintenance of way foremen have headquarters at points where mail is not regularly picked up, and to be required to remit reports daily would entail too much additional mileage on motor cars with consequent loss of time.

Daily Statements of Costs and Performance

Daily statements, showing maintenance of equipment and transportation expenses in such detail as is necessary, are furnished to the division officers by the division auditor five days after the day for which the report is rendered. In order to state these accounts on a daily basis it is necessary that a day's accounts be cleared by the division auditor's office each day. While many difficulties were encountered when the daily system was first undertaken, the system now is working smoothly and it is surprising how very near to actual final figures for the month these daily expenditure statements run. The daily transportation costs, on the fifth day following each day's operations, are wired to the auditor disbursements who issues for the use of the operating vice-president and other general officers a statement showing these costs separately for each division. It should be explained that the ease with which daily transportation costs are supplied is largely due to the preparation of transportation payrolls by the use of tabulating machines.

The Use of Tabulating Machines

Under the system of timekeeping employed, all information carried on the time tickets is recorded on the punch card in detail and in such manner as to make readily available additional information—other than that currently required—without additional clerk hire; whereas, the hand method of timekeeping previously used necessitated the actual handling of time tickets over and over again for the purpose of preparing payrolls and various reports, such as distribution by primary accounts, states and operating divisions, and the preparation of I. C. C. report Form "B" and numerous other statistical reports currently required by the management.

The trip or daily time tickets being first checked by the chief timekeeper as to service performed and rates of pay applicable, are then coded and covered by punch card so arranged as to show information as follows:

Day.
Month.
Employee's number.
Service code.
(Information punched from time tickets into the six digits of the service code field, embraces:
1. Class of service-passenger, freight, etc., by directions.
2. Nature of run-straight-way, turn-around, through, local, etc.
3. Train and engine runs by engine districts, train numbers, etc.
4. Deadheading, due to balancing power, etc.
5. Special service-running official trains, attending investigations, etc.
6. Work service, and account number chargeable.
7. Yard service and name of yard.)
Actual miles run.
Time on duty.
Days or miles paid for.
Overtime hours allowed.
Extra hours allowed.
Rate code.
Amount.
Trips.

SEABOARD AIR LINE RAILWAY COMPANY Form 2265

PAYROLL CLEARANCE SHEET

_____DIVISION OR DEPARTMENT MONTH OF_____ 192__

Name of Pay Roll	Period	Total Amount of Pay Roll	Deductions Paid by Expense Voucher	Commission on Collections 143-H	S. A. L. Uniform Account 715	Agents and Conductor's Cash	727 O.U.D. Accrued Expense Paymaster's Cash	Deductions Credited Operation	Unclaimed Wages	Pay Checks	Paymaster Date Due To	Paymaster Date Fwd. To
	1st											
	2nd											
	1st											
	2nd											
	1st											
TOTAL												

Form 2265

The cards key-punched from transportation time tickets are run through tabulator and the following information transcribed to a proof sheet:

Rate code.
Actual miles.
Total time in service.
Number of trips.
Miles or days paid.
Overtime hours.
Extra hours.
Total amount.

I. C. C. Wage Report

For the purpose of establishing a control of payrolls and labor distribution and to form a basis for various statistical reports, a control sheet for each rate code number is maintained and information previously tabulated on proof sheet is transcribed to the control sheet from which is prepared the I. C. C. report of trainmen, their service and compensation, form "B," and analysis of wages and overtime report which details labor charges to passenger, mixed, through and local freight service as follows:

Wages for miles made.
Constructive wages.
Omitted time.
Run-around and other penalty claims.
Deadheading—Sickness, relieving men at their request, balancing power, 16-hour law, etc.
Arbitrary—Tied up less than 14 hours, held away from home terminal, etc.
Road overtime.
Initial terminal delay.
Final terminal delay.
Total wages and overtime.

Ease in Supplying Special Information

In addition to the above reports, periodical distribution of transportation payrolls to I. C. C. accounts is made. Much basic information not currently required is provided for in punching these cards, and when called upon for additional information with respect thereto—which is frequently the case—the division auditor is able to readily supply it by a run

of the cards through the tabulator, thereby realizing a further clerical saving. The cards for each period are assorted by classes of service, accounts and rate codes, when they are run through the tabulator to arrive at the total amount charged to each primary account which amount is transcribed to pick-off sheets. The amounts shown on the condensing sheets are balanced with totals at end of each payroll period and summarized at the end of each month and used as a basis for making payroll distribution.

System Periodical Estimates

The division auditor transmits over the wires to the auditor disbursements on the 14th, 21st, 28th and 8th, for the periods ending the 8th, 15th, 22nd and last of the month respectively, the total expenses of his division by general accounts as a basis for the issuance of system periodical estimates the day following. The division auditor issues semi-monthly in detailed typed form, maintenance of way, maintenance of equipment and transportation expenses, these statements are schapirographed and distributed to all division officers interested and a further supply sent to the auditor disbursements for distribution to general officers interested. For maintenance of equipment and transportation these semi-monthly statements are a summary of the daily cost figures already referred to.

Departmental Transfers Unnecessary

For the use of superintendent, master mechanic and the division engineer, the division auditor furnishes periodically, or as required, copies of expense work sheets from which the daily, periodical and semi-monthly expense figures are prepared and which indicate the source of each class of expenditure incurred. We have found by thus supplying these officers with details of charges against their appropriations there exists no necessity for further departmental refinement.

Operating Statistics

Operating statistics are compiled in division offices by use of tabulating machines and cards from the following sources:

Car miles, lading and gross ton-miles, from wheel reports.
Fuel consumption, from coal chute foremen's daily reports.
Wages, from engineers' and conductors' time tickets.
Time on road and total time, train- and engine-miles, from train sheets.
Rating ton-miles, from division time tables.

There are two sets of punch cards used for preparation of operating statistics—one known as freight-car-mile card, the other as train and engine-statistic card; the latter card carries wages and fuel. The daily report of operating statistics contains the following information separately for through and local freight service for the day in question and accumulation for the month to date:

Speed per hour.
Gross ton-miles per crew-hour.
Cost per crew-hour.
Cost per 1,000 gross ton-miles.
Loaded car-miles.
Gross ton-miles.
Net ton-miles.

From the same punch card "Class statement of loaded and empty car miles by directions and kinds of cars" is made periodically. These reports and car mile portion of O. S. Reports 1 and 2 constitute the principal reports compiled from the freight-car-mile card.

From the train and engine-statistic card, the periodical report "freight train performance" separately for through and local freight service by individual engine districts and directions is prepared, carrying the following information:

Train-miles.
Gross ton-miles, thousands.
Wages.
Train load, gross.
Train load, net.
Gross ton-miles per crew-hour.
Per cent of rating utilized.
Per cent of gross ton-miles, north and south.
Per cent of gross ton-miles by directions for each engine district to total.
Total.
Cost per 1000 gross ton-miles (current and previous year).
Per cent of increase or decrease, cost per 1000 G. T. M.

In addition to the above, monthly report is prepared showing comparison of mileage and tonnage statistics (current month, previous month and same month last year) separately for through and local freight service, carrying the following information by directions:

Freight train miles.
Crew hours.
Gross ton-miles.
Net ton-miles.
Speed per hour.
Train load, gross.
Train load, net.
Gross ton-miles per crew-hour.
Per cent rating utilized.
Per cent gross ton-miles, north and south.

The following is also shown, but not by directions:

Total wages.
Per cent overtime to total wages.
Wages per crew-hour.
Wages per 1,000 gross ton-miles.

While these are the major reports currently prepared direct from punch card covering train service, all basic information is carried on the card for additional cost reports as and when required. Several other reports are compiled which are based on information obtained from the above mentioned reports. All passenger car-miles are accumulated daily from passenger wheel reports by hand.

Basic Figures Available for Cost Studies

The division auditors receive copies of all necessary reports, such as conductors' freight and passenger wheel reports, dispatcher's train performance sheets, etc., and inasmuch as all wages, pay rolls, vouchers and other basic cost reports are audited by the division auditor, the receipt of these reports enables the division auditor to promptly prepare and render statistics of cost and performance of any nature without having to depend upon other departments for basic figures needed in the preparation of statistical reports.

In view of the relative proximity of the division auditor's office to the source of these reports, it is possible for the division auditor to be in possession of these divisional reports within two days after date.

The division auditor's office is so organized that each bureau accomplishes a certain portion of the detailed work needed for the daily statistical reports, and each bureau works to the end that figures are available for the statistical forces in the machine room bureau one day after receipt thereof. The machine bureau can then compile and complete the figures by use of punch cards and machines in one day. The items on these daily reports are represented by a system of codes, and figures reported thereunder are transmitted to the auditor disbursements by wire to be consolidated with similar reports from other divisions to be furnished operating officials. On the same date, the division superintendent is furnished a copy of each report. This enables him to make a study of actual costs on his division four days after date.

By reason of the promptness in the statement of accounts and furnishing statistics of cost and performance, the division operating officers are afforded material assistance over that available to them when similar statistics of cost and performance were prepared in the general office and costs of operations, instead of being available for the entire division in a centralized office, could only be obtained by consolidating charges taken up by the superintendent, the master mechanic, the division engineer, the storekeeper and others originating charges.

Promotes Better Understanding

Experience has demonstrated that the segregation of accounting and statistical work to relieve operating officers of direct responsibility therefor, has tended to promote a better understanding of the respective problems of the operating and accounting officers. The relationship of the division auditor to the operating staff is such as to enable him to offer suggestions and render assistance to the operating officer with respect to statistics of cost and performance and other

matters of importance. In addition, the division auditor becomes familiar with the physical property of the operating division, thereby insuring the company intelligent accounting for involved joint facility operations, important addition and betterment projects and other equally important work.

Saving in Cost

The aggregate cost under the present system of disbursement accounting is considerably less than was formerly spent for general office forces and division accounting and statistical forces under the superintendents, division engineers, master mechanics and other operating officers—notwithstanding a greater volume of work is being handled—largely by reason of the fact that work which was then performed in a great number of offices is now concentrated in the ten offices named thereby realizing savings in clerical hire through the adoption of uniform methods, the use of labor saving machines and development of specialized clerks for the several branches of the work.

Supply Car Operation on G. N.*

By G. R. Watland
District Storekeeper, Great Northern, St. Cloud, Minn.

SIX SUPPLY CAR UNITS operate over the Great Northern, covering approximately 7,000 miles of main and branch lines each month, not including deadhead mileage. Three supply cars operate out of St. Cloud, Minn., covering main and branch lines east of Devils Lake; one out of Devils Lake, N. D., covering lines from Devils Lake to Havre, Mont.; one out of Great Falls, Mont., covering lines from Havre to Cut Bank, Mont., and south to Butte, Mont., and Billings, and one out of Hillyard, Wash., covering all lines west of Cut Bank, Mont.

Each supply car unit consists of a living car, one material car fitted up with racks and shelves for small material such as lamp chimneys, wicks, burners, dry batteries, bolts, nuts, washers, nails, handles, lamps, lanterns, tinware, track tools, all kinds, etc., one oil car for miscellaneous oils, waste and grease; one tank car each for kerosene and gasoline and necessary box and flat cars for heavy material such as frogs, switches, switch stands, angle bars, track bolts and spikes, fencing, farm gates, cattle guards, posts, signs, lumber, etc. From 3 to 10 cars are required for the heavy material, depending upon the amount of material to be delivered. In addition to this, one or two box cars and a flat car are required for tools and material of all kinds as the supply cars pass over the line. The number of cars required for scrap depends on the amount of scrap accumulated at sections and tool houses.

The supply cars are in charge of a supply car storekeeper and one assistant. The run over their territory is made every 30 days. The cars are operated on a schedule made up in advance of leaving the home terminal. The schedule is made up by the supply car storekeeper immediately on arrival at his home station and shows the date and train number in which it is expected the supply cars will leave the home terminal on their next trip and shows the same information for each day of the entire trip. Sunday and holiday layovers are also shown on the schedule. The schedule, when completed, is handed to the storekeeper for approval. It is then typed and a copy mailed to each superintendent over whose division the supply cars will operate. The superintendents immediately examine the schedule and if they find that for any reason the supply cars cannot be handled on any date shown on the schedule, they wire the storekeeper so that the schedule can be corrected before departure. Objections are seldom made to any part of the schedule.

Supply car requisitions are submitted by the superintendents every 30 days and cover what is estimated will be required by sections and stations for a period of 30 days. These are special printed forms. These requisitions are approved by the general superintendent and then sent to the storekeeper direct. The stock clerk then provides for any material not in stock before the departure of the cars.

A loading list is made by each supply car storekeeper while his supply cars are undergoing repairs, the sheets being so arranged that each kind of material for the various sections or stations can be totaled, these totals being drawn off on distribution paper. One list is made up of all wood material such as cattle guards, gates, crossing planks, signs, frog blocking, etc., and sent to the lumber yard foreman, who arranges to load out his portion including any lumber, etc., for which he is holding requisitions. A similar list is made for material at the store, separate lists being made for heavy material such as frogs, switches, guard rails, track bolts and spikes, hand and push cars, etc., and for small material such as track tools, frog bolts, batteries, etc., for sections and supplies for stations. All heavy material is loaded directly into box cars or on flat cars by the shipping department, the small material being loaded by the assistant supply car storekeeper, and one or two laborers.

All material to be delivered by supply cars with the exception of oil and gasoline is invoiced by supply car storekeepers before the departure of the supply cars. These invoices are taken out by him and used as a delivery sheet; that is, between stations all small supplies to be delivered at the next station are picked out from the invoices and laid in a convenient place for unloading on arrival at the station, so that delivery can be made with a minimum of delay. The invoices, after delivery of the material has been made, are mailed to the storekeeper where they are priced and extended and sent out for acceptance.

On the arrival of the supply cars at a station, the scrap cars are set at the scrap piles where the scrap is loaded by section men while gasoline, oils, grease, etc., as well as tools and material of all kinds, are being delivered. Supply cars stop at all pumping plants, coal chutes, depots, section tool houses, towers, interlockers and signal maintainer's supply houses to deliver oils and material. Tool houses are carefully checked for surplus or needing-repair tools as well as other material and any surplus is picked up by the cars. All scrap accumulations are picked up each month and the right of way kept as free from scrap as possible.

The supply cars are accompanied over the line by the trainmaster, roadmaster, pump repairmen, signal maintainers, and in some cases by the superintendents. These officers assist in checking sections and tool houses for surplus or needing-repair material and co-operate with this department in every way in the economical handling and use of material.

About a year ago authority was issued for new steel underframe oil cars. These cars are equipped with oil tanks of sufficient capacity to cover the entire trip, have self-measuring pumps, barrel cradle and track for convenience in filling, waste, grease and soap bins. The cars are equipped with Baker heaters and are constructed so as to hold the heat during the winter months. The floor is covered with galvanized sheet steel and the walls lined with the same material from the floor to about six inches above the oil tanks. The balance of the walls and ceilings are painted sta-white. The galvanized steel on the floor and walls reduces the fire hazard to a minimum and makes it possible to keep the cars much cleaner. They are the only oil cars of their kind in use. Business cars formerly used by superintendents, but retired from service because of several divisions having been abolished, have recently been secured for living and office quarters.

* Presented at First Annual Convention of Great Northern Stores offices, Great Falls, Montana, July, 1924.

Construction and Repair of Railway Equipment

I. C. C. Censures Six Carriers for High Cost of Locomotive Repairs in Contract Shops

THE INTERSTATE COMMERCE COMMISSION in a decision from which five members of the commission dissented, has added to its condemnation of equipment repairs in outside shops, criticism of six additional railroads which, in 1920, resorted to outside repair work to help meet the traffic demands expected at the time the contracts were made.

The six carriers criticized in the latest decision are the Burlington, the Milwaukee, the Reading, the Frisco, the Missouri Pacific, the Cotton Belt and the Texas & Pacific. The criticism directed at the last two is less severe because the outside work was small in amount and in the case of the Texas & Pacific was largely necessitated by the destruction of two important shops by fire.

The decision in general expressed the view that the repair work done in the outside shops, was at costs materially in excess of the cost of similar work in the carriers' own shops and in some cases was incurred because of a want of adequate facilities in the carriers' shops which the excess expenditures would have supplied or gone far to supply.

Abstract of the decision as it applies to each of the six carriers follows:

Chicago, Burlington & Quincy

July 23, 1920, respondent entered into contracts with the Baldwin Locomotive Works, for the repair of 15 locomotives and with the Davenport Locomotive Works, Davenport, Iowa, for the installation of new boilers on five switch engines and the repair of additional locomotives, not exceeding 15 in all. The contracts were on a cost-plus basis. That with Baldwin provided for cost of material furnished, at stipulated prices, and cost of direct labor, plus 110 per cent of distributed labor to cover overhead expense, plus 15 per cent of the whole for profit. The Davenport contract provided for the cost of the material furnished, plus 5 per cent thereof (except the five boilers, purchased at a flat price from Davenport), and cost of direct labor except on the five boilers, plus 125 per cent of the labor cost to cover overhead plus 20 per cent of the total labor and overhead for profit.

Of the contract number only seven were sent to the Baldwin plant and the contract was then rescinded. Of the number sent, two received class two repairs and five received class three. Including the five switch engines upon which new boilers were erected, 17 locomotives were repaired at Davenport, although the business slump had intervened before some had been sent.

The investigation developed that the total cost of the contract work was $254,043 in excess of the cost of similar work in the respondents' shops. The commission's opinion with reference to this road says:

"The record does not impeach respondent's good faith or establish a careless attention to its own interests in entering into the contracts. It is none the less true, however, that an excess expenditure of the character and even approaching the amount of that above mentioned is regrettable and at all times to be avoided if possible. Irrespective of the existing relationship of normal shop capacity to normal repair demands, an investment of the margin of such an outlay in increased shop facilities which would more nearly meet emergencies would make for increased efficiency and economy."

The contracts into which this respondent entered were distinctive in that they covered the conversion of so-called Vauclain compound locomotives into simple ones, in addition to the classified repairs the locomotives received. Due to the fact that this type of locomotive embodied a faulty mechanical principle considerable trouble was experienced with broken engine frames and the resultant disruption of the driving gear. Frame breakage had been excessive at all times, the records indicating their occurrence at the rate of about two frames per engine per year, 54 engines having broken 121 frames in 1919. This fact fully justified the respondent in converting the locomotive into the simple type. In December, 1919, the United States Railroad Administration consented to the sending of 20 compound freight locomotives to the Baldwin Locomotive Works for conversion and repairs, upon the condition that the selections should not interfere with the movement of traffic and that the carrier should bear the cost. Later there was an additional lot of 30. The repairs made were class two and class three, according to the extent of the firebox repairs, and the work included, in addition to the general repairs and the conversions, the initial application of superheaters and outside valve gear to all of the lot of 20, and of superheaters to all but 14 of the lot of 30, and of outside valve gear to all of them. New and heavier engine frames were also applied.

During this period of the contract the respondent maintained shops for repairs at various points on its system. It was conceded that the shops were suitably equipped for conversion work but were handicapped with a shortage of boiler-makers and laborers. The controlling factor in the decision to send the compounds to the Baldwin plant for conversion and general repairs was that locomotives of heavy classes, including the Mikados purchased from the United States Railroad Administration, were coming in for shop.

No overtime was worked in 1920, and about the middle of November, following the slump in business, the shop working hours were reduced to 40 per week. In March, 1921, the hours at the Milwaukee and Minneapolis shops were cut in half.

The 20 locomotives sent to the Baldwin plant in 1919 were converted and repaired at flat prices, based upon detailed specifications of work to be done. The contract covering the 30 additional locomotives was on a cost-plus basis, that is, material at specified prices and the cost of direct labor, plus 110 per cent of distributed labor to cover all overhead expense, plus 15 per cent of the whole for profit. The Baldwin plant declined to enter into a flat-price arrangement as to this lot, upon the ground that it had lost money on the first lot.

For purposes of comparison the investigators compute the cost of the conversion and the repair of five Vauclain compounds in the respondent's Milwaukee and Dubuque shops in the latter part of 1919 and early part of 1920. As of the period of the Baldwin work upon the lot of 20 locomotives the cost to the respondent of the five locomotives handled in its own shops, inclusive of equated labor and material costs and of shop, store, and other expenses, minus material recovered, was computed as an aggregate of $80,892, or an average of $16,178. As of the 30-lot period the latter figures were equated to cover the August, 1920, wage award, and further modified in instances to make appropriate allowances for variations in firebox work and superheater applications. Upon the respective comparisons the investi-

gators found the total excess cost of the Baldwin work to have been $731,197.

The concluding opinion of the I. C. C. is as follows:

"As before stated, the situation outlined in the foregoing review differs from those presented in other cases in this investigation in that it involved primarily the conversions of locomotives of an admittedly faulty type, subject to excessive maintenance costs, into more satisfactory power. This exceptional work, plus the requisite repairs, appears to have presented something more than the ordinary shop problem. This, together with a maximum record of 20 conversions in respondent's shops in 1915, the subsequent increase in its other motive power, the shop and traffic situations, the desirability of modernizing the compounds, and the better cost showing in its relation to the total accomplishment, might leave less room for criticism than if the contracts had embraced merely the usual classified repair work. But it appears that, apart from the conversion problem, respondent's shops are equal to no more than normal demands, or a maximum represented by 10 per cent of its motive power out of service for all repairs requiring more than 24 hours. In these circumstances a consistent policy of efficient and economical management would require that such excess expenditures as the contract work has repeatedly been shown to involve be made in the procurement of such shop enlargements or additions to or modernization of shop equipment as would enable the carrier reasonably to meet exceptional demands."

Philadelphia & Reading

On April 5, 1920, this company entered into a contract with the Baldwin Locomotive Works for the repair of 15 or more of its Mallet compound locomotives. Under this contract 15 Mallets were given classified repairs. Approximately an average of six months' time was consumed in the repair of each locomotive.

The Reading justified the entry into the contract on the ground of a lack of adequate facilities of its own for handling Mallets for the purpose of making the classified repairs necessary to keep pace with the requirements. Its main shop at Reading, Pa., had a Whiting hoist to facilitate the handling of Mallet locomotives. The remainder of the facilities were not able to take care of heavy classified repairs to Mallets. It was disclosed that between January 26, 1920, and January 25, 1921, embracing the period of the contract repairs, 23 Mallets were given classified repairs in the Reading shop. These repairs were mostly class five, generally lighter than the Baldwin repairs.

The Baldwin contract was on the customary cost-plus basis, and its principal provisions included the cost of material entering into the work and of direct labor, plus 90 per cent of the amount of distributed labor to cover all overhead expense, plus 15 per cent of the whole for profit. The repairs made under the contract were classes three, four and five. The total cost of the repairs, as ascertained by the investigators from respondent's records, was $429,320. The comparable cost of the work in respondent's own shop was computed by the investigators as $208,847, making the computed excess cost of the Baldwin work $220,473.

In giving its opinion on the case the I. C. C. stated that the respondent's contention that in its shop situation the question of the excess cost of the Baldwin work is merely academic only serves to emphasize what the record compels one to regard as an improvidence in management. In February, 1920, a plan was submitted for an extension of the shop at an estimated cost of $423,350 with a capacity for 10 Mallets at a time. In June of the same year a modified plan was submitted, contemplating an expenditure of approximately $275,000. The excess cost of the contract repairs on 5 Mallets would have gone far toward providing the mechanical department with the much needed facilities.

St. Louis-San Francisco

Under a contract dated June 10, 1920, which provided for an indefinite number, five locomotives of this respondent were repaired by the Pittsburgh Boiler & Machine Company, Pittsburg, Kan. All received class three repairs. The terms of the contract embraced the cost of the material furnished by the contractor, plus 15 per cent for handling, and the cost of direct labor, plus 65 per cent thereof for overhead and supervision.

May 26, 1920, the respondent opened negotiations with the Kansas City, Mexico & Orient for the repair at the latter's shops for an indefinite number of the respondent's locomotives. The results of the negotiations were incorporated in a written contract which was never signed but the work was done. The principle contract provision covered the invoice price of any material furnished by the Orient, together with the freight charges, if any, plus 10 per cent for handling and the cost of direct labor, plus 45 per cent for overhead, supervision, and all undistributed shop expense not directly chargeable to the locomotives. Under this arrangement 13 locomotives were repaired. The respondent also secured eight fireboxes from the Orient.

In the latter part of June, 1920, the respondent sent to the Baldwin people for repair two locomotives which were totally wrecked in a head-on collision. They were repaired on agreed flat prices, based upon joint inspection. In 1919 and 1920 the respondent purchased 94 new locomotive-boiler back ends.

The aggregate cost of the repairs at Pittsburg was $52,994, or an average of $10,599 per locomotive. The individual costs ranged from $9,058 to $12,765. The cost of comparable repairs in the respondent's own shop at West Springfield, Mo., was computed by the investigators, with a wide variation between the individual costs, as an average of $7,651. The indicated average excess cost of the contract repairs was $2,947, or an aggregate of $14,736 for the five locomotives.

With a similar variation in individual costs, particularly as between the class two and class three repairs, the total cost of the 11 completed classified repairs at the Orient shop was $169,655, or an average of $15,423. Comparable repairs in the respondent's own shops were computed by the investigators as costing a total of $105,970. The indicated excess cost of the contract work was $63,684, or an average of $5,789 per locomotive.

The two wrecked locomotives were repaired by the Baldwin plant at a total cost of $104,400. The commission considered as a fair price for the new boiler back ends $6,000 each. With an average cost of $7,968 per unit, the 66 back ends purchased are shown as representing a total excess expenditure of $129,914. The foregoing excess cost for the locomotive repairs and for the 66 back ends aggregate $208,335.

Traffic, motive power, and shop conditions principally where given by the carrier in justification of the recourse to the Pittsburg and Orient shops, and more particularly the shop conditions in respect of the rebuilding of the wrecked locomotives and the purchase of the back ends. It was brought out that the respondent's shops were unable to make the large back ends due to small equipment. It was also observed that the average repair costs per locomotive were materially higher in the Orient than in the Pittsburg shop.

The following quotation gives the commission's opinion on this case:

"In the light of the facts that not many locomotives were sent to either contract shop and that the work was not extended beyond the advent of the general business depression, we may accept the submitted justification of those contracts as having met an emergency. On the other hand, the wisdom of rebuilding the wrecked locomotives at such high figures, which restored to service power units only partially

the equivalents of new ones, is not clear. The outstanding item, however, is that of the purchased back-ends. If the investigators' estimate is approximately correct the total outlay for those essential locomotive parts is startlingly in excess of their cost in respondent's own shops with proper equipment for their manufacture; and it would appear that a small fraction of the excess expenditure would have provided this equipment. In so far as additional productive capacity is needed to meet requirements, large payments to outside concerns are not in the interest of efficient and economical management."

Missouri Pacific

This respondent sent to outside shops for class three repairs, in 1920 and 1921, a total of 49 of its locomotives. Prior to the period of the contract repairs the respondent had maintained five shops at which classified repairs were made.

The Grant Locomotive & Car Works, Houston, Tex., repaired 31 of the owners' locomotives. The terms upon which the work was performed embraced the actual cost of labor, including prorated time of the foreman and the shop superintendent, plus 40 per cent to cover all burdens, plus 10 per cent of the aggregate for profit, and the cost of the material furnished by the contractor, plus 20 per cent thereof. The respective average increases per locomotive, Grant shop over respondent's shop, were shown as $6,961 and $4,148. Upon these bases, the total excess cost was computed to have been $88,582. The John H. Murphy Iron Works, Alexandria, La., repaired three locomotives at an excess cost of $22,073. The three locomotives repaired by the Manufacturers Railway Company, St. Louis, Mo., were completed showing an excess cost of $9,906.

In justification of the contracts the respondent cited traffic demands and motive power and shop conditions. Figures were submitted to show that the road was handling a peak load on its lines and as a result the shops were working at maximum capacity considering the fact that there was a shortage of mechanics.

The I. C. C. stated: "The record affords little opportunity for a determination of the ability of respondent's shops to meet power requirements in 1920, when the contract repairs were made, except by contrasts with 1919, and the contrasted items do not tell a very definite story. It is therefore necessary to rest largely upon the general testimony, not rebutted of record, that the shop forces were incomplete and inadequate to keep pace with the demands for maintenance of power. It is observed, at the same time, that in all a large number of locomotives was repaired at what the record indicates to have been a cost very much in excess of the cost of similar work in respondent's own shops. In the face of this regrettable incident of resorts to outside shops, every energy should unceasingly be bent upon a realization of the utmost production of which the company facilities and forces are capable, in the effort to minimize, and better yet to eliminate, such excessive maintenance costs."

St. Louis Southwestern

July 2, 1920, this respondent entered into a formal contract with the Grant Locomotive & Car Works for the repair by the latter of not less than 10 or more than 20 of respondent's locomotives. Under this contract six locomotives, two of 2-6-0 and four of 4-6-0 type, were given class three repairs.

The total cost of the contract work, including freight, was shown by the investigators to have been $99,495. The excess cost was shown to have been $58,329, or an average of $9,721 per locomotive.

By a letter dated January 6, 1921, the respondent terminated the contract arrangement, effective when the locomotives theretofore forwarded to the plant were repaired, for the stated reason that, principally by reason of the business depression, it would be possible to take care of required repair work in respondent's own shops.

The commission stated, "whatever the true answer to the cost question in this instance may be we deem it unnecessary to go farther than to accept the limitation of the contract work, in the circumstances stated, as denoting a policy on the respondent's part, with the return of normal conditions, to utilize its own facilities and forces in the future maintenance of its motive power and equipment."

Texas & Pacific

Under contracts dated April 10 and 12, 1920, with the John H. Murphy Iron Works and the Ruston Foundry & Machine Shops, respectively, of Alexandria, La., two of respondent's locomotives were repaired by the first-named contractor and three by the second named. All were repaired during 1920. One of these received class three repairs, while the rest received class two.

The terms of the Murphy contract were, the cost of direct labor, plus 40 per cent for overhead, plus 10 per cent of the total for profit; all material, except small supplies to be furnished by the contractor at market prices, to be furnished by respondent; the work to be subject to check by respondent's representatives.

The Ruston contract provided for the cost of direct labor, plus 40 per cent for overhead, plus eight per cent of the total for profit; small supplies to be furnished by the contractor at market prices, plus 20 per cent for handling; otherwise, the same as the Murphy contract.

Recomputing the costs of comparable repairs in respondent's own shops and using for the purpose the same five locomotives used by the investigators, respondent figures a total excess contract cost of $16,882, or an average of $3,376 per locomotive.

The respondent's principal shop, at Marshall, Tex., was partially destroyed by fire June 9, 1918. It was developed that due to the slow progress of the preliminaries and the delivery of the necessary material that the shop was not completed until July, 1920. On March 28, 1920, the shop next in size, at Big Spring, Tex., was practically destroyed by fire. This led to negotiating the contracts.

The opinion of the commission was to the effect that the data of the investigation did not satisfactorily indicate how far the two fires, with the offsetting emergency arrangements, disabled the respondent to meet the demands for the maintenance of power. The I. C. C. further stated that it does appear that some time in 1919, during Federal control, five of the respondent's locomotives were sent to the Grant Locomotive & Car Works for repair. "Gratifying as is the fact that but five locomotives were repaired under the two contracts here in question, the record indicates that the work was done at a considerable excess cost. Correspondence in evidence discloses that respondent's officials regarded some of the labor charges as unreasonable and sought revisions, and also were dissatisfied with the quality of the work in certain respects. At all events, we deem the circumstances to justify us in assuming that in future respondent will leave nothing undone to avoid further recourse to the costlier contract work."

Five Commissioners Dissent

Commissioners Aitchison, Potter, Cox, Lewis and Hall dissented from the opinion. Commissioner Hall in rendering his opinion stated:

"For reasons sufficiently indicated in my expression appended to a former report, 66 I. C. C. 73, I take no part in this proceeding and no share of responsibility for the conclusions expressed either in this or in any other report of the series. Through them all, thus far, runs the seeming assumption that a railroad owes a duty to the public to repair

or rebuild its own locomotives and, perhaps, its other rolling stock in its own shops, and that it violates that duty when the work is done in some other shop. Even when the difference in cost is negligible or the need great it is admonished to do the work at home. 'Honest, economical and efficient management' does not require a man to make or mend his own shoes.

"What a railroad shall do with the force of men and the shop facilities which it has at the time is a matter of judgment over which we have no review. We can not direct it to employ more men, or less men, or other men, or to build or alter shops. Its duty to the public is that of a common carrier subject to the interstate commerce act and related acts. Our duty and our jurisdiction stop with those acts and beyond them it is not for us to check, control, or condemn."

I. C. C. Reports on Air Brake Investigation

Better Maintenance of Existing Equipment and Changes in Design Are Recommended

THE INTERSTATE COMMERCE COMMISSION has made public an opinion in its investigation of "power brakes and appliances for operating power-brake systems."

The opinion, from which three commissioners in part dissented, embodies the following conclusions:

Improvements in the operation of power brakes for both passenger and freight trains are essential and must be effected.

Improvements in power-brake appliances can be made and increased safety in train operation can and must be obtained.

A power-brake system for passenger and freight trains should insure that only a service application of the train brakes will occur when a service reduction of brake-pipe pressure is made.

A power-brake system for passenger and freight trains should provide means whereby effective emergency brake-cylinder pressures will be obtained when an emergency reduction of brake-pipe pressure is made from a fully charged brake system.

A power-brake system for passenger and freight trains should provide means whereby effective emergency brake-cylinder pressures will be obtained when emergency reduction of the brake-pipe pressure is made after a full service brake-pipe reduction has been made.

A power-brake system for passenger and freight trains should provide means whereby effective emergency brake-cylinder pressures will be obtained when an emergency reduction of brake-pipe pressure is made following release after a full service brake application.

A power-brake system for passenger and freight trains should provide means whereby the engineman can control the release of pressure from brake cylinders and effect such release by graduated steps or gradually in order that he may decrease as well as increase brake-cylinder pressures as required to control at relatively uniform rates the speed of trains.

A power-brake system for passenger and freight trains should provide for obtaining and maintaining brake-cylinder pressures within prescribed limits for specified periods of time during brake applications.

In addition to these general requirements it is clear that full specifications and requirements covering more fully the functions, maintenance, and operation of power brakes and appliances should be adopted. Consideration will be given to this and to the form of order to be issued by us. This case will be held open for that purpose.

This investigation has been under way since February, 1922, and was instigated on the petition of the Automatic Straight Air Brake Company. On March 24, 1922, a questionnaire was sent out calling on 196 carriers to furnish certain information relative to rules and practices in the use of hand brakes, the number of accidents resulting from failure promptly to control the speed of trains on grades and other related information.

It appeared that on 25 railroads hand brakes were used to control the speed of freight trains, or to supplement the power brakes in controlling the speed of such trains, not only on 122 grades for which specific data were furnished, but also on numerous branch lines. On 169 other railroads reporting a total of 1,807 grades, the speed of trains was controlled exclusively by power brakes. The information furnished under this head covered a total of 1,929 grades of 1 per cent or more having a length of 3 miles or more. In many cases the grades on which hand-brake operation was reported were less severe, both in percentage of gradient and length, than grades upon which trains were controlled entirely by means of power brakes. During the three-year period 1919-1921, inclusive; there occurred on these 1,929 grades 67 accidents, each of which resulted in personal injury or property loss of $500 or more, caused by failure properly to control the speed of trains. These accidents caused the death of 15 persons, the injury of 46 persons, and a property loss of $432,908. During the year 1921 the accidents attributed to specific causes mentioned in our questionnaire numbered 1,336. These accidents caused the death of 19 persons, the injury of 1,305 persons, and entailed a property loss of $343,654.

History of Air Brake Development

The opinion of the commission follows the detailing of these facts with a history of the development of the air brake since 1870, including an outline of the work done by the Master Car Builders' Association and the present American Railway Association. Following a description of the evolution of the Westinghouse and New York Air Brake systems, the commission's report outlines the development of the Automatic Straight Air Brake Company's triple valve with particular and detailed reference to the rack tests and then the road tests on the Norfolk & Western.

At the hearings held in connection with this investigation, the Automatic Straight Air Brake Company presented evidence to show that certain defects were present in the power-brake devices in common use; also evidence of the developments, installations and services of the A. S. A. brake. It contended that the more general use of these devices would afford freedom from a number of troubles now commonly encountered and result in material improvement in power-brake operation.

Contend A. S. A. Brake Experimental

Other parties appearing at the hearings contended that the A. S. A. brake devices were still in an experimental stage; that service tests to which they had been subjected had not been sufficiently extensive to warrant final conclusions and that the demonstrations on the Norfolk & Western in 1921 were conducted under favorable conditions that did not represent the usual service conditions encountered on long trains of empty cars or with a leakage such as commonly exists.

After the hearing had been completed, in order to deter-

mine certain questions which conflicting evidence had introduced, the hearing was reopened April 27, 1923, for the purpose of a test by the I. C. C. Bureau of Safety of the Automatic Straight Air Brake equipment on the Norfolk & Western.

An abstract of the report on these tests as submitted by W. P. Borland, director of the Bureau of Safety, appeared in the *Railway Age* of March 1, 1924, page 500. Issue was taken with Mr. Borland's findings by various railway executives and their testimony will likewise be found in the *Railway Age* of March 8.

The tests on the Norfolk & Western were also observed by a committee of railway representatives headed by C. E. Chambers, superintendent of motive power of the Central of New Jersey and chairman of the Committee on Safety Appliances of the American Railway Association, Mechanical Division. The findings of this committee were considerably at variance with those of Mr. Borland. The commission's opinion discusses the points at issue and in general approves the findings of its own representatives.

Dissenting Opinion

Commissioner McManamy dissented from the majority opinion in part and discussed the report as follows:

The conclusions of the majority in this case are directed towards the accomplishment of two definite purposes, (*a*) better maintenance of existing power-brake systems, and (*b*) fundamental changes in the design of power-brake systems to make possible additional functions.

I am in full accord with the conclusion requiring better maintenance. The evidence abundantly shows the need for better maintenance of power-brake systems and the improved performance which will result therefrom. No witness, either for carriers, the brake manufacturers, or the employees, testified that power-brake systems as a whole were maintained in an efficient or satisfactory operating condition. On the contrary, every witness testified that improved performance would result from better maintenance and that such better maintenance should be required. I am not in agreement, however, with the conclusions which require changes in the design of power-brake systems in order to make possible the performance of additional functions not now included in existing standard freight brakes, because (1) the record does not show that the existing power-brake systems if properly maintained are inadequate to safely control trains; (2) if existing brake systems are adequate, I question our authority to require the use of improved devices; and (3) the investigations and tests are insufficient, to my mind, to definitely show that the proposed changes in design can be made without introducing undesirable features which will offset any benefits which may be derived therefrom.

In my opinion the basic question presented in this proceeding is: When properly maintained are existing power-brake systems adequate to safely control trains under present operating conditions? If we find in the affirmative, we should prescribe and enforce standards of maintenance that will insure proper performance and maximum efficiency of existing power-brake systems. In my opinion it has not been shown that present brake systems are inadequate; therefore a further question arises. If existing systems are adequate to safely and efficiently control trains, and if improved devices are available which are not being used, have we authority, in addition to requiring better maintenance of the power-brake systems in use, to also prescribe specifications and requirements which will compel the use of such improved devices? I question that section 26 of the act, under which this proceeding is brought, gives us such authority.

No Evidence Showing Brakes Inadequate

The outstanding feature of this case, to my mind, is the fact that the record is barren of evidence that the existing power-brake systems, when properly maintained are inadequate to safely and efficiently control trains under present-day operating conditions. This statement is supported by the majority report. For instance, the following appears in the report:

> Officials who are directly in charge of air-brake inspection and maintenance, and instruction of employees in air-brake operation on the lines of several of the carriers, testified in this proceeding. It was the consensus of opinion of these witnesses that the present freight brake equipment with K-type triple valves now generally in use is adequate and in accordance with the requirements of safety when properly maintained. With reference to improvements in power-brake appliances, the principal suggestion offered was that efforts to improve conditions of maintenance should be continued.

Efforts to improve power-brake systems should, without doubt, be diligently continued, and where it can be definitely shown that improvements in design have been made which would increase the safety of operation, such improvements should be incorporated in the existing power-brake systems. But, to my mind, the evidence in this case has fallen short of showing that improvements are available which do not, at the same time, possess undesirable features sufficient to counteract the good effects hoped for, thus leaving no net gain.

While the conclusions of the majority are stated in general terms and without reference to any particular type of brake, the report throughout is based upon a comparative test of the automatic straight air brake, in which all of the features recommended are said to be incorporated, and the Westinghouse brake, the one in general use. The additional features are not used on the latter, because they are said to be undesirable. It is unfair to select specific brake applications and attempt to base a conclusion thereon as to the relative merit of different power-brake systems. This was the principal cause for the disagreement between observers at the Norfolk & Western tests.

Viewing the situation in its broadest light, the present power-brake system has been in general use for more than half a century and from time to time changes and improvements have been made. It is in service on 2,500,000 cars and locomotives. The uncontradicted testimony of carriers' witnesses is that when properly maintained it safely and efficiently performs the required functions. This testimony is from representatives of railroads that are safely and satisfactorily controlling by means of power brakes heavy passenger and freight trains on the steepest mountain grades in the country. In view of this testimony we can not find that standard power-brake systems, properly maintained, do not meet every requirement of the law. On the other hand, the record shows that the other brake system has placed in service during the past few years only 199 brakes on four different railroads. Of these, 140 are on freight and 59 on passenger cars. The only information available respecting the performance of these brakes has been developed during the past two or three years and, in so far as the emergency features are concerned, is limited almost entirely to that resulting from the Norfolk & Western and Virginian tests. To my mind these tests alone are insufficient to form the basis of an order directing fundamental changes in the design of power-brake systems. If, based on these tests, we find that certain additional functions, such as emergency following release, emergency following service, or the ability to graduate brakes on or off can be performed, we must at the same time give consideration to the undesirable performances, which admittedly occurred during these tests, resulting from the changes in design. Among these are the effect of leakage variation in piston travel and the slowing up of serial action which are referred to in the report.

Satisfactory Braking for 100-Car Trains

Quick serial action of brakes required 30 years to develop to a point where it is possible to obtain satisfactory brake performance on 100-car freight trains. Briefly, it means that the action of the brakes throughout the train must be quicker than the action of the slack in the train. That is, the brake on each car must respond so quickly that each car will be stopped by its own brake and not by striking the car ahead. The tests show that substantially more time was required to apply the A. S. A. brakes on 100-car trains than to apply the standard brakes. This necessarily results in greater shocks and in greater damage. To my mind, the ability to make smooth stops is more important in freight-train braking than the ability to make quicker stops, and the testimony is uncontradicted that the shocks resulting from the emergency application of the A. S. A. brakes on the test trains were severe.

The testimony is conflicting as to whether or not the shocks were more severe than on similar trains equipped with standard brakes, and no tests were made to determine this point.

If the additional features to be incorporated will increase the severity of the shocks on long freight trains, which are at present a serious source of danger to train crews, it may well be that freight-train braking would be safer and more satisfactory without such a feature. It is well recognized that greater property damage and more personal injuries result from rough freight-train stops than from failure to get emergency action following release or following service.

The additional increased safety in mountain braking which comes from the additional supply of air carried on each vehicle with the A. S. A. brake is a factor which may well be given consideration, but the performance of the test trains did not afford opportunities for demonstrating what value this would be in an emergency.

For the above reasons I can not join with the majority in the conclusion that we should order fundamental changes in brake designs as stated in their report, without further evidence (1) of the need for such additional features and (2) of the possibility of their satisfactory performance. I believe, however, that further trial of these changes in design should be encouraged in every proper way.

I am authorized to state that Commissioners Eastman and Potter join in this expression.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING exhibited a substantial increase during the week ended August 2, as compared with the weekly totals in July, a heavier movement of miscellaneous commodities and of grain and grain products bringing the total up to 945,731 from 925,859 in the preceding week. The week's loadings total 87,735 cars less than in the corresponding week of last year, and 103,068 cars more than in 1922. The Southern and Southwestern districts showed a slight gain as compared with the corresponding week of last year. The loadings of grain and grain products and miscellaneous commodities were heavier than a year ago. The summary as compiled by the Car Service Division of the American Railway Association is as follows:

REVENUE FREIGHT CAR LOADING WEEK ENDED AUGUST 2, 1924

Districts	1924	1923	1922
Eastern	221,444	249,508	194,682
Allegheny	191,892	222,578	172,714
Pocahontas	42,412	43,153	27,798
Southern	131,490	130,946	111,819
Northwestern	139,069	172,922	151,371
Central Western	149,875	150,273	130,946
Southwestern	69,549	64,086	53,333
Commodities			
Grain and grain product	56,702	52,894	58,260
Live stock	26,468	30,927	26,493
Coal	144,865	190,509	78,965
Coke	6,948	13,478	8,458
Forest products	66,812	76,091	55,310
Ore	54,644	83,565	66,809
Mdse., l. c. l.	239,804	240,593	228,353
Miscellaneous	349,488	345,409	320,015
Total	945,731	1,033,466	842,663
July 26	925,859	1,041,415	848,858
July 19	930,284	1,029,429	845,548
July 12	910,415	1,019,809	850,676
July 5	759,942	850,082	707,025
Cumulative total, Jan. 1 to date	27,658,938	28,979,703	24,115,037

The freight car surplus for the week ended August 2 was 322,530, a decrease of 22,362 cars as compared with the preceding week. This included 146,840 coal cars and 138,734 box cars. For the Canadian roads the surplus was 28,725, including 24,200 box cars.

Car Loading in Canada

Revenue car loadings in Canada for the week ended August 2 totalled 48,938 cars, a decrease of 698 cars from the previous week. There was a falling off in Eastern Canada of 762 cars, but a gain in the west of 64 cars. In comparison with the same week last year loading showed a decrease of 2,554 cars, of which 1,929 were in the East and 625 in the West. The cumulative totals up to August 2 were 1,653,844 cars for 1924, compared with 1,541,519 in 1923, an increase of 112,325 cars.

Car loadings, by commodities, for the week ended August 2, and for the previous week this year are as follows, respectively:

TOTAL FOR CANADA

Commodity—1924	For the week ended July 26 Cars	For the week ended August 2 Cars
Grain and grain products	4,279	3,699
Live stock	2,149	2,182
Coal	5,022	4,677
Coke	176	151
Lumber	3,534	3,653
Pulp wood	2,059	2,048
Pulp and paper	1,765	1,706
Other forest products	2,160	2,203
Ore	1,485	1,412
Merchandise L.C.L.	15,005	15,137
Miscellaneous	12,002	12,070
Total cars loaded	49,636	48,938
Total cars received from connections	27,564	27,572
Total cars loaded for corresponding week, 1923.	51,366	51,492

Derailment at Long Island City

AN EASTBOUND PASSENGER TRAIN of the Long Island Railroad moving at moderate speed, was partially derailed at Tower H, Sunnyside Yard, Long Island City, about 5:30 p.m. on July 30, by the premature throwing of a switch under the seventh car; and this and the two following cars of the train were thrown violently to one side. The first of these fell against a standing electric locomotive and was partly overturned. One passenger was killed and 36 were injured. The locomotive which was struck was waiting to move to the track on which the passenger train was running, and the helper on this locomotive, who had been sent to throw the switch after the train had passed, appears to have lost his head. The switchstand is of the triple lock type, fastened by an electric lock which is controlled by the signalman in Tower H. The helper had telephoned to the tower and, on his request, the towerman had unlocked the switch. The wreck occurred at 5:31 p.m. and the train carried about 700 suburban passengers destined for points on the Port Washington branch.

This collision occurred within the limits of New York City and a report on it was issued by the New York State Rapid Transit Commission on August 1. The Commission holds the engine helper and the towerman responsible and also says that the railroad company is blameworthy for not having issued more complete instructions governing the operation of this switch. It says, however, that both the towerman and the locomotive helper "complied with the regulations, except the general regulation which requires that due caution be observed at all times." The commission recommends that the railroad be required to install an "electric automatic locking device" at all main line passenger traffic switch points within the limits of the city of New York.

The locomotive helper and the towerman were arrested and held by Magistrate Conway under bail of $25,000 each on charges of homicide.

Fatal Wreck at Long Island City, N. Y., on Wednesday Evening, July 30

Electric locomotive consists of two units; rear unit overturned. P. & A. Photo.

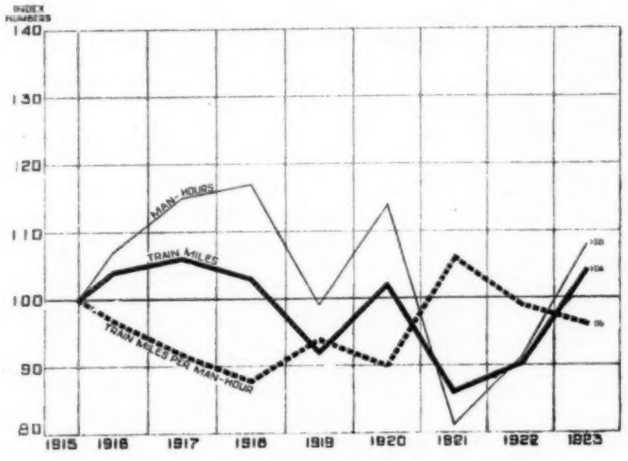
Report Shows Improved Railroad Performance

National Industrial Conference Board Studies Increased Utilization of Labor in Train Service

THAT the relative value of a man-hour of work contributed by railroad employees in each branch of the train and engine service has been greater during the recent years than in 1915 and the years immediately following is the conclusion reached in a study which has just been made by the National Industrial Conference Board. The summary of the report develops these findings in the following language:

More ton miles have been produced per man-hour worked by the road freight service employees; more passenger miles per man-hour worked by the road passenger service employees; more equated traffic units per man-hour worked both by the yard service employees and by the train and engine service employees as a whole.

The number of train miles, car miles or locomotive miles



Train-Miles per Man-Hour in Road Freight Service

produced per man-hour has at times during recent years been less than in 1915. This type of index, however, does not take into account certain changes in the characteristics of railroad operation during recent years, which have had an adverse effect on production per man-hour, but which in nearly all cases have been accompanied by an increase in the labor and responsibility of the employees concerned.

The operation of heavier freight trains has made possible an increase in freight traffic with but a small increase in the number of trains. The average freight train operated in recent years, however, consisted of more cars, each more heavily loaded, than the average in 1915, and therefore required a greater amount of work from all the employees engaged in freight train operation, in addition to increasing their responsibility to some extent.

During recent years the railroads have carried a passenger traffic greater than in 1915 with an actual decrease in the number of passenger trains operated. The average number of cars per train, however, has tended to increase, imposing a greater amount of work and responsibility upon passenger locomotive crews, and an increase in the average number of passengers per car has to some extent increased the labor and responsibility of the train crews in the passenger service.

As the volume of freight traffic increases from one year to another, the amount of work required of the road freight and yard service employees tends to increase in greater proportion than the increase in the amount of traffic handled, because of the tendency to congestion of the lines, yards and terminals of the railroads. The amount of traffic handled per man-hour worked by the employees in the road freight and yard services, therefore, is generally somewhat less in a year of heavy freight traffic than in a lighter traffic year. Statistics for 1918 and 1920, as compared with the preceding and following years, illustrate this point.

In 1923, however, the freight traffic carried by the railroads was the heaviest on record, the number of train miles, car miles and locomotive miles produced per man-hour worked by the road freight and yard service employees was greater than in either 1918 or 1920. That of itself indicates increased efficiency on the part of the railroads in their utilization of labor, to which increased efficiency of the employees concerned in all probability contributed.

Year 1915-1916 Taken as Base

In the report the fiscal year ended June 30, 1916, is taken as a base, principally, the report explains, because it was the first year in which complete returns under the I. C. C.'s new classification of railroad employees and their hours of service were made, and because comparable figures cannot be obtained for previous years.

Purpose of Study

To explain the purpose of the report, the following statement is made:

Since the work performed by the train and engine service employees is so closely related to the manner in which that work is assigned and supervised by management, and also to the degree of efficiency to which the plant and equipment of the railroads are utilized, the amount of traffic moved per man-hour worked by the train and engine service employees is not an index of the efficiency of the men alone, but rather of the efficiency of the whole railroad organization, management as well as labor. The discussion which follows, therefore, concerns itself not so much with the relative efficiency of various groups of train and engine service labor over a period of years as with the relation of the amount of work performed by these groups of workers to the traffic output of the railroads, and therefore, with the performance of the railroads as a whole in the movement of traffic.

The study considered three different angles. It discussed the increase in railway facilities, the volume of traffic and utilization of the increased facilities, and, third, the number of employees in train and yard service and the results secured per man-hour in the various services.

Some of the high points of the report follow in abstract:

With respect to equipment, as well as trackage, the railroads greatly increased their ability to handle the growing traffic of the country by replacing the locomotives and cars retired from service with others of greater capacity and by installing additional units.

Utilization of Plant and Equipment

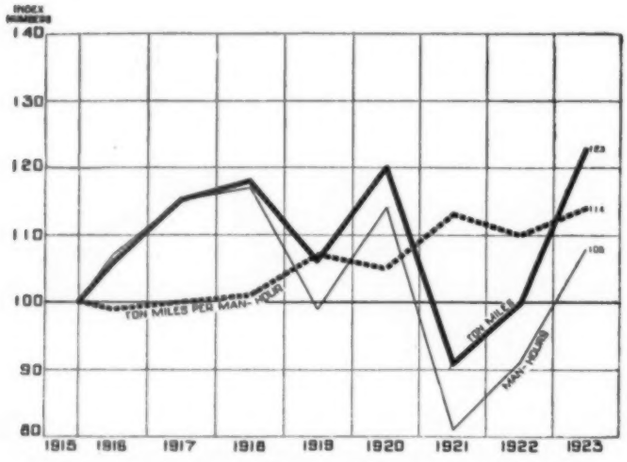
A comparison of the figures for the number of ton miles produced by the railroads from 1915 to 1923 and those for the number of freight train miles produced reveals that the latter has fluctuated progressively less widely than the former. This is an indication of increasingly efficient operation and has been due to the substantial increase which has taken place in the average number of tons of freight per

train, or the average train load. The average freight train load in 1923 was 18 per cent greater than in 1915, having increased from 604.3 to 713.0 tons.

In 1915 the average number of tons per loaded car was 24.6; in 1923 it was 27.9, an increase of 13 per cent, although averages of 29.3 and 29.1 tons were attained in 1918 and 1920, respectively. In 1915 the average number of cars per freight train was 36.6; by 1923 it had increased 9 per cent to 39.9. The average haul per ton of freight increased 10 per cent from 162.38 miles in 1915 to 178.86 miles in 1923.

The number of ton miles produced by the railroads in 1923 was 23 per cent greater than in 1915, but the number of freight train miles was only 4 per cent greater. The total number of freight car miles was but 13 per cent greater than in 1915.

From 1915 to 1922 the total tractive capacity of the steam



Ton-Miles Per Man-Hour in Road Freight Service

locomotives in use on the Class I railroads increased 21 per cent and the total capacity of the freight cars 9 per cent.

The number of passenger miles has fluctuated to a much greater extent than has the number of passenger train miles. Most of the passenger trains are operated whether the amount of traffic offered justifies their operation or not, because they have been advertised in published time-tables, or because state commissions require their operation.

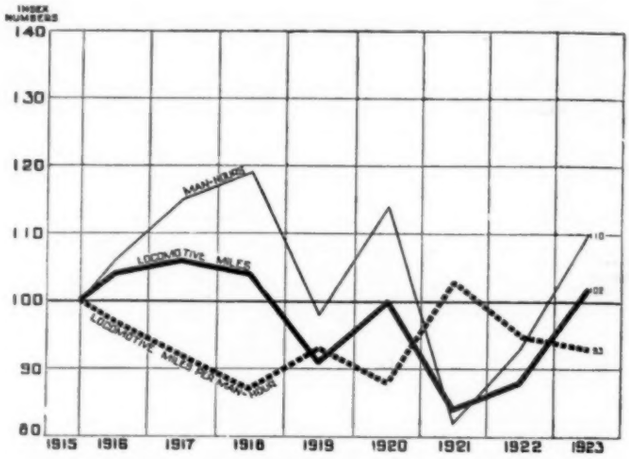
The number of passenger miles produced by the railroads in 1920 was 39 per cent greater than in 1915, but the number of passenger train miles was 1 per cent less. In 1923 the number of passenger miles produced was 13 per cent greater than in 1915, and the number of passenger train miles 5 per cent less.

In 1915 the average number of passengers per train was 58.4; in 1923, 69.1, an increase of 18 per cent. The average journey per passenger increased in length 11 per cent from 1915 to 1923; from 34.73 miles to 38.55 miles.

In 1923 the density of the freight traffic on the railroads, as measured by the number of ton miles produced per mile of road operated, was 20 per cent greater than in 1915, and the density of the passenger traffic was 11 per cent greater.

Labor: Growth of Labor Force

The average number of men employed in the train and engine service of the Class I railroads in the fiscal year 1915-16 was 284,824, almost 21 per cent of the total number of rail-



Locomotive-Miles Per Man-Hour in Road Freight Service

road employees. By 1923 the average number employed in this branch of railroad service had increased 21 per cent to 343,382, the largest average during any year on record. The establishment of the eight-hour day in 1917 had the effect of increasing the average number employed, especially in the yard service, without increasing the total man-hours of work contributed by these employees. From 1915 to 1923 the number of man-hours of all train and engine service employees increased 8 per cent, from 872,206,015 to 940,678,563.

The average number of men employed in the train and engine service in 1915 was divided among the various branches of that service in the following proportion: Road freight service, 51 per cent; road passenger service, 20 per cent; and yard service, 29 per cent. The total number of man-hours of work contributed in that year by the train and engine service employees was divided as follows: Road freight service, 51 per cent; road passenger service, 16 per cent; and yard service 33 per cent. The number of man-hours worked by the men in the road freight service was proportional to the number employed, but in the road passenger and yard services this was not the case, due principally to the longer working week which prevailed in the yard service.

In 1923 the average numbers were: Road freight service, 47 per cent; road passenger service, 17 per cent; and yard service, 36 per cent. Man-hours: Road freight service, 51 per

TABLE I—FREIGHT TRAFFIC STATISTICS, CLASS I RAILROADS

Period	Total ton miles		Freight train miles		Freight car miles (thousands)		Loaded freight car miles (thousands)		Per cent loaded to total freight car miles
	Number	Index	Number	Index	Number	Index	Number	Index	
Fiscal year 1915-1916	373,516,310,356	100	618,132,319	100	22,021,386	100	15,179,865	100	69.0
Calendar year 1916	396,365,917,082	106	641,257,552	104	22,639,357	103	15,879,371	105	70.1
Calendar year 1917	430,319,014,635	115	654,499,208	106	22,695,745	103	15,932,050	105	70.2
Calendar year 1918	440,001,713,665	118	639,011,216	103	22,186,705	101	15,024,900	99	67.7
Calendar year 1919	395,679,051,729	106	571,763,128	92	20,845,320	95	14,312,795	94	68.7
Calendar year 1920	447,278,209,869	120	628,913,843	102	22,624,671	103	15,362,642	101	67.9
Calendar year 1921	340,862,150,770	91	530,692,935	86	19,796,657	90	12,480,346	82	63.0
Calendar year 1922	371,945,560,691	100	555,686,170	90	20,767,491	94	13,964,558	92	67.2
Calendar year 1923[1]	457,589,846,000	123	641,556,000	104	24,993,105	113	16,424,240	108	65.7

[1] Preliminary figures.

cent; road passenger service, 15 per cent and yard service, 34 per cent. The number of man-hours worked in the various branches of the train and engine service in 1923 was distributed in approximately the same proportion as it was in 1915.

Utilization of Labor; Road Freight Service

The number of employees in the road freight service of the Class I railroads in 1923 was 12 per cent greater than in 1915, and the number of man-hours worked by these employees was 8 per cent greater. Since 1918, except in 1920, the number of employees has been somewhat greater than the number of man-hours relative to 1915, due to the shortening of the working day.

The number of ton miles produced per man-hour worked by the road freight service employees in 1915 was 840.6, and did not vary to any great extent until 1919, for which year it was 902.4, an increase of 7 per cent over 1915. Beginning with 1921 the number of ton miles produced per man-hour in each year has been at least 10 per cent greater than in 1915. The best results were attained in 1923 when 954.6 ton miles were produced per man-hour, an increase of 14 per cent over 1915.

Freight crews are to a considerable extent responsible for the promptness with which they make their runs from terminal to terminal, but are not generally responsible for the number of tons of freight with which their trains are loaded. On the other hand, it is reasonable to assume that the increase in the average freight train load which has been effected during recent years has to some extent reduced the speed of freight train operation, thereby tending to decrease the number of freight train miles produced per man-hour.

In 1915 the number of freight train miles produced per man-hour worked by the man in the road freight service was 1.39. In 1921 it was 1.47 train miles, an increase of 6 per cent. In 1923, 1.34 freight train miles were produced per man-hour, 4 per cent less than in 1915.

In 1923, then, the number of ton miles produced per man-hour was 14 per cent greater than in 1915, while the number of freight train miles produced per man-hour was 4 per cent less than in 1915. On the one basis the road freight service employees apparently increased in productivity; on the other, they seem to have decreased. To determine from these two statements which was the case, many factors should be considered.

The average freight car load increased from 24.6 tons in 1915 to 27.9 tons in 1923, a gain of 13 per cent. The average number of cars per freight train increased 9 per cent from 36.6 in 1915 to 39.9 in 1923. An increase in the average freight car load and train load affects more directly the work of the locomotive crews. In general, the heavier the train, the heavier and more powerful the locomotive, and the greater the responsibility of the engineer and the work of the fireman. The operation of fewer freight trains in relation to the amount of traffic has in all probability necessitated more stops being made. Furthermore, because the train load has become heavier, the average freight train has undoubtedly consumed more time in starting and has not attained so high a speed when fully under way as when the average train load was lighter. Such figures as are available indicate that an increase in the train load tends to decrease the speed of freight train movement.

The very factors which have tended to increase the production of ton miles per man-hour have operated to decrease the production of train miles per man-hour. In 1920 the number of gross ton miles produced per train hour—and here the weight of the freight cars as well as that of the freight carried is included—was 14,877; in 1921, 16,567; in 1922, 16,188; and 16,768 in 1923. The production of net ton miles per train hour, in which the weight of the freight alone is considered, was in 1920, 7,302; in 1921, 7,510; in 1922, 7,490; and in 1923, 7,771. It will be noted that results in 1921 were distinctly better than in 1920, although traffic was much lighter. The production of 1922 was slightly below that of 1921. In 1923, however, the production was above that of any of the preceding years, due in part to the favorable operating conditions obtaining throughout the greater part of the year, and in part to the increase in the average train load to which new equipment and equipment in good repair to some extent contributed.

On the basis of ton miles produced per man-hour, then, the productivity of the men in the road freight service has increased during recent years.

On the basis of freight train miles produced per man-hour, the productivity of the road freight service employees has been somewhat less in recent years, with the exception of 1921, than in 1915. Factors tending to decrease the speed of freight trains are almost entirely beyond the control of the road freight service employees.

The number of locomotive miles produced by the railroads

TABLE II—EMPLOYMENT, HOURS, PERFORMANCE, ROAD FREIGHT SERVICE, CLASS I RAILROADS

Period	Employment		Man-hours		Ton miles per man-hour		Freight train miles per man-hour	
	Number	Index	Number	Index	Number	Index	Number	Index
Fiscal year 1915-1916	145,262	100	444,333,394	100	840.6	100	1.39	100
Calendar year 1916	154,027	106	474,073,195	107	836.1	99	1.35	97
Calendar year 1917	165,953	114	512,514,340	115	839.6	100	1.28	92
Calendar year 1918	169,819	117	520,425,125	117	845.5	101	1.23	88
Calendar year 1919	151,015	104	438,476,957	99	902.4	107	1.30	94
Calendar year 1920	163,774	113	505,039,179	114	885.6	105	1.25	90
Calendar year 1921	140,410	97	360,025,131	81	946.8	113	1.47	106
Calendar year 1922	141,879	98	403,450,828	91	921.9	110	1.38	99
Calendar year 1923[1]	163,292	112	479,330,303	108	954.6	114	1.34	96

[1] Preliminary figures.

TABLE III—PERFORMANCE, ROAD FREIGHT LOCOMOTIVE CREWS, CLASS I RAILROADS

Period	Freight locomotive miles		Man-hours locomotive crews		Locomotive miles per man-hour	
	Number	Index	Number	Index	Number	Index
Fiscal year 1915-1916	710,205,187	100	181,564,987	100	3.91	100
Calendar year 1916	736,130,185	104	193,008,261	106	3.81	97
Calendar year 1917	751,021,510	106	209,249,020	115	3.59	92
Calendar year 1918	735,834,168	104	215,509,277	119	3.41	87
Calendar year 1919	649,646,396	91	178,611,400	98	3.64	93
Calendar year 1920	712,852,175	100	206,139,235	114	3.46	88
Calendar year 1921	595,325,710	84	148,084,586	82	4.02	103
Calendar year 1922	624,731,287	88	168,087,655	93	3.72	95
Calendar year 1923[1]	725,663,000	102	200,418,490	110	3.62	93

[1] Preliminary figures.

from year to year does not always fluctuate in proportion to the number of train miles produced. There is a considerable amount of light locomotive mileage. Severe weather conditions may require an abnormal amount of helper service. The addition of a car or two to a passenger train or several cars to a freight train may necessitate the use of a helper.

Because of light and helper locomotive mileage, the total number of locomotive miles produced in both the freight and passenger services always exceeds the number of train miles. . . . In the tables the locomotive crew man-hours include the hours worked by the engineers and firemen on steam locomotives and by the motormen and helpers on electric locomotives in each class of service.

In 1915 the number of freight locomotive miles produced per man-hour worked by locomotive crews in the road freight service was 3.91. This figure has been exceeded in only one year since 1915, and that was 1921, in which 4.02 freight locomotive miles were produced per man-hour, an increase of 3 per cent over 1915. The light traffic conditions of 1921 were conducive to the attainment of high averages in many phases of railroad operation, of which this is one. In 1922, 3.72 freight locomotive miles were produced per man-hour, 5 per cent less than in 1915; in 1923, 3.62 freight locomotive miles per man-hour, 7 per cent less than in 1915. As compared with 1918 and 1920, the heaviest freight traffic years prior to 1923, when the number of freight locomotive miles produced per man-hour were 13 per cent and 12 per cent respectively, less than in 1915, the results attained in 1923 demonstrate an increase in efficiency.

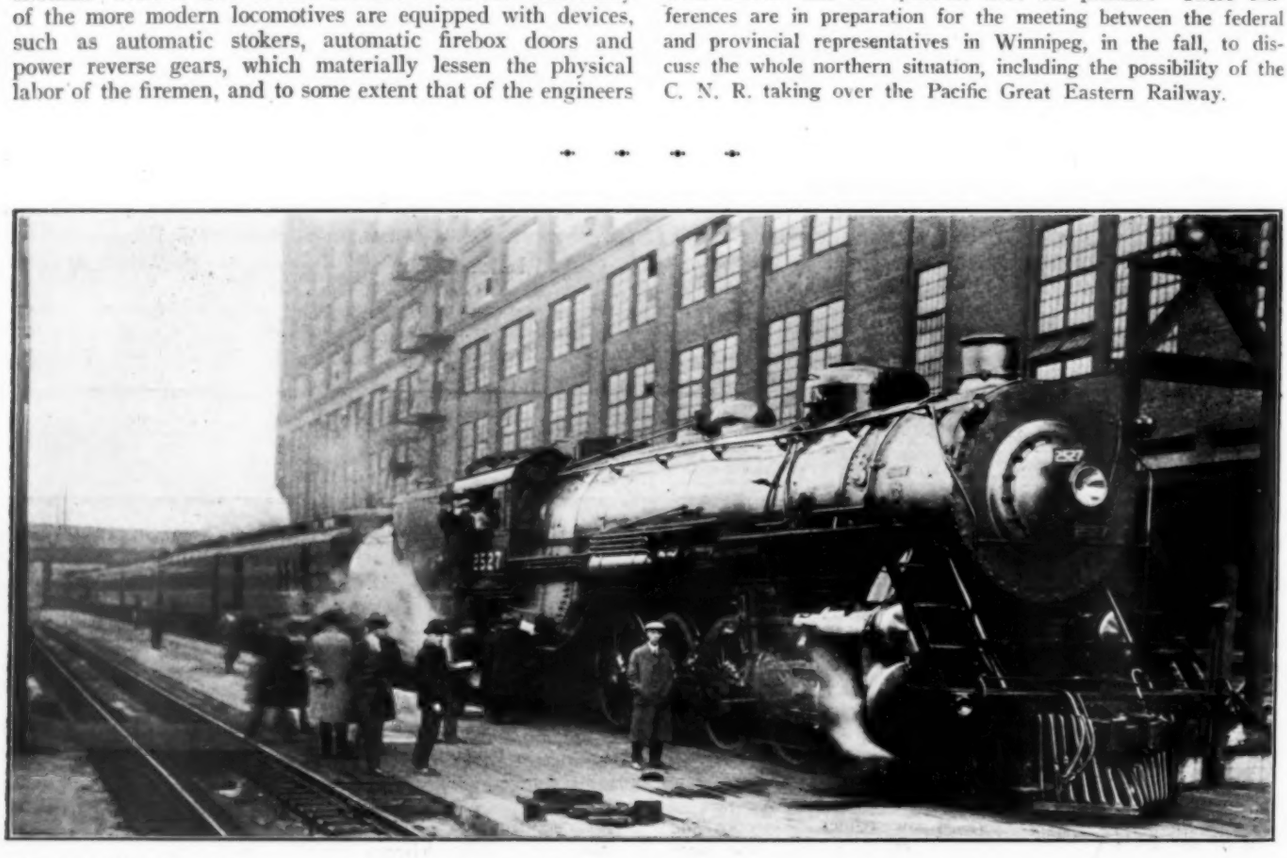
This index does not take into account the increased responsibility which the more complicated design and more intricate appliances of the more modern locomotives have put upon engineers, nor the increased labor and responsibility which heavier and longer trains have put upon both engineers and firemen. Neither does it take account of the fact that many of the more modern locomotives are equipped with devices, such as automatic stokers, automatic firebox doors and power reverse gears, which materially lessen the physical labor of the firemen, and to some extent that of the engineers as well, operating locomotives so equipped. It should be remembered, however, that the majority of the locomotives in service in this country are hand-fired, coal-burners without many of the most modern labor-saving appliances. Furthermore, it cannot be said in view of the increasing complexity of railroad operation that the responsibility of locomotive crews as a whole has been lessened during recent years.

The same factors which have been responsible for a smaller production of freight train miles per man-hour worked by all road freight service train and engine employees in recent years as compared with 1915—longer and heavier trains moving more slowly and making more frequent stops—have in all probability operated to decrease the number of freight locomotive miles produced per locomotive crew man-hour.

The number of passenger locomotive miles produced per man-hour worked by passenger locomotive crews in 1915 was 9.59. Although this figure was nearly equaled in both 1916 and 1921, it was exceeded for the first time in 1922, in which year 9.65 passenger locomotive miles were produced per man-hour. In 1923, 9.72 passenger locomotive miles were produced per man-hour, a slight improvement over 1922, and an increase of 1 per cent over 1915.

THE MISSOURI & NORTH ARKANSAS RAILROAD having asked for a hearing on its guaranty settlement and the Minneapolis, Northfield & Southern a rehearing on its deficit status, the Interstate Commerce Commission has assigned these cases for hearing respectively on September 3 and 4 at Washington before Examiner V. L. Almond.

FOLLOWING A CONFERENCE IN VICTORIA, B. C., between Premier Oliver and Sir Henry Thornton, president of the Canadian National Railways on the transportation problem of Northern British Columbia and Alberta, M. H. McLeod, chief engineer, went further into the question with the premier. These conferences are in preparation for the meeting between the federal and provincial representatives in Winnipeg, in the fall, to discuss the whole northern situation, including the possibility of the C. N. R. taking over the Pacific Great Eastern Railway.



International Newsreel Photo

The New Oriental Limited on the Great Northern

General News Department

The **Pere Marquette** has announced that beginning October 1 its refrigerator cars will be placed on a mileage basis.

Employees of the Baltimore & Ohio with their families, enough to fill five trains of 12 coaches each, picnicked on Sunday, August 10, at Willow Grove, Pa., on the Northeast Pennsylvania division of the Reading, 16 miles north of Philadelphia. The picnic was managed by the Baltimore & Ohio Railroad Veterans' Association.

Floods caused by heavy rainfall in Wisconsin during the week ending August 8 resulted in the washing out of a number of bridges and the derailment of one train. On the Chicago & North Western three bridges were washed out between Milwaukee and Green Bay, while a passenger train was derailed by earth washed down on the track. Damage on the Chicago, Milwaukee & St. Paul was confined to the washing out of the approaches to several bridges.

The New York Central Lines Field Day is announced to be held in Cleveland, Ohio, on the grounds of the West Technical High School, on Saturday, September 20. This is the first annual track meet to be held by the New York Central people, and plans are being made for an elaborate program. The general chairman is Col. H. W. Taylor, 466 Lexington avenue, New York City. The committee is not going to solicit advertising for the official program and has voted to make the price of admission tickets 50 cents. These tickets will be put on sale all over the New York Central Lines.

The fatal derailment on the Long Island Railroad on July 30, reported on another page of this paper, was the subject of a presentment by the Grand Jury of Queens County on August 13, when J. J. Moore, who prematurely threw the switch, A. C. Hunt, the towerman, who unlocked it, and J. W. O'Loughlin, held responsible for appointing an incompetent towerman, were indicted for manslaughter in the second degree. The railroad company was censured as guilty of "criminal responsibility" and the New York State Transit Commission for "failure to adequately function in its control of the railroad."

The Pennsylvania now uses 40 motor trucks in the movement of local freight over routes formerly served by regular local freight trains. The length of these daily motor truck routes is now 1,412 miles, more than double the mileage operated last spring. Among the routes recently established (with the length of each in miles) are the following: Trenton, N. J., to Lambertville, 16; Trenton, N. J., to Linden, 49; Uniontown, Pa., to Ruffsdale, 38; Toms River, N. J., to Sea Girt, 23; Sea Girt, N. J., to South Amboy, 33; Sea Girt, N. J., to Jamesburg, 28; Philadelphia, Walnut St., to Trenton via Pemberton, 78; Enon, O., to Alliance, 53; Trenton, N. J., to Phillipsburg, 51.

Correction

In the article entitled "Why Continue Flagging in Automatic Territory?" by J. Lowell White, superintendent transportation, Atlantic Coast Line, which was published in the *Railway Age* of July 26, page 149, the word "not" was omitted in the last clause of the first sentence of the concluding paragraph. This sentence should read "To the argument that the elimination of rule 99 will put too much responsibility on one fallible human being, there is no complete answer, other than automatic train control; which is *not* the question under discussion here." While the portion of the article which preceded this sentence should leave no confusion in the mind of the reader regarding the intent of the author, this correction is made in order that there may be no uncertainty regarding his thought.

The Transcontinental Air Mail

Aeroplane mail service between New York and San Francisco, which was started on July 1, completed its first month of service without serious accident, but the postmaster general says that the financial success of the experiment is still to be demonstrated. The income was below the cost of operation and maintenance. The post office department intends to conduct an intensive campaign of traffic solicitation. So far as physical operation is concerned, the postmaster general has no hesitation in predicting success. In the 31 days of July, the mail planes flew 173,910 miles, and made an average time westbound of 39 hrs. 49 min.; average eastbound, 36 hrs. 21 min. The best railroad mail schedules are 86 hrs. westbound and 90 hrs. eastbound. Lights are being erected at the New York end and at the San Francisco end so as to facilitate the movement of planes approaching destination after dark.

Program of German Railway Congress

The railway technical congress to be held in Berlin on September 22-27 under the auspices of the Society of German Engineers and the German State Railways will consider, among other things, the following subjects:

Freight transportation, with reference to heavy cars, rapid unloading and the relationship of these cars to bridges and tunnels.

Locomotive progress—thermal efficiency, steam condensation, turbine and Diesel locomotives, screw-shaped flues, pulverized coal, iron flues, economy of internal combustion locomotives.

Electrification and signaling.

Shop practice.

Passenger and transfer stations, operating questions, subaqueous tunnels, switching.

The exhibits in connection with the congress will be most extensive. More than 100 various types of locomotives and motor cars will be on view, including over 50 different types of steam locomotives, 10 electric locomotives, 6 Diesel locomotives, sundry compressed air, fireless and internal combustion engines and a turbo-locomotive. All kinds of freight and passenger cars will also be on exhibit. There will be a special demonstration of yard operation and various diagrams, films, and models will be available through the co-operation of the Berlin-Charlottenburg Technical Institute. One day will be devoted to brake tests on a 90-axle passenger train.

F. K. Loeffler, president of the Techno-Service Corporation, 46 West Fortieth street, New York, whose company is the American agent of the Borsig Company, the German locomotive builders, has volunteered to give whatever further information is desired to persons from the United States or Canada, who may be interested in attending the congress.

Great Northern Holds Stores Convention

What is believed to be the first system convention of store officers on an American railroad was held at Great Falls, Mont., on July 23 and 24 by the Great Northern Stores Association as the first of a series of meetings which it is proposed to hold annually from now on. The meeting, which was conducted under the direction of Robert Steel, district storekeeper, Great Falls, included addresses by Howard Hayes, general storekeeper of the system, and president of the Association, O. H. Wood, assistant purchasing agent, and I. Parker Veazy, Great Northern attorney for Montana.

Other business included a report on the meeting of the Purchases and Stores section of the American Railway Association at Atlantic City by C. E. Talmadge, assistant general storekeeper; motion pictures of supply train operation over the Northern Pacific and of shop delivery practices on the Southern Pacific; together with the presentation and discussion of reports and papers

prepared by members on the following subjects: Stores Department Accounting, Specifications for Trays and Shelving, Material Classification, Facilities for Handling Material, Supply Car Operation; Delivery of Material to Shops, Yards, and Repair Tracks; and Storekeeping Methods for Forest Products.

The association, which is newly organized, has for its object the improvement of methods and practices used in the ordering, handling, storage, and distribution of materials and the accounting in connection therewith. Its membership is composed of active and associate members, local storekeepers, division and district storekeepers and their assistants, chief clerks, and general foremen at general and district stores, together with the general storekeeper and his assistants constitute the active members while associate members include such other employees in the purchases and stores organization as are admitted to the organization by action of a general committee. Provision is also made for honorary members.

The general storekeeper and the assistant general storekeepers are ex-officio president and vice-presidents, respectively, of the Association, while the management of the activities is conducted by a general committee consisting of three members selected by the Association annually at its regular meeting from among members proposed by a nominating committee which is also elected at each annual meeting. The general committee makes the necessary arrangement for the meetings of the Association, conducts the general meetings, selects and appoints the members of all standing and special committees, and examines all the communications, papers and reports intended for presentation to the Association deciding which of them or what portions of them shall be presented. A. L. Nelson, district storekeeper at Hillyard, Wash., was elected chairman of the general committee for the ensuing year.

A Heavy Movement of Perishables

The movement of potatoes, fruit and other perishable freight from the south over the Pennsylvania during the past season has been very heavy, and the record of cars passing through Edge Moor yards, about 23 miles south of Philadelphia, has exceeded all past figures. During the month of June the total number of cars dispatched, north and south, was 84,198, an increase of 2,085 cars over June, 1922, which was the best previous record. The movement northward on a single day, July 20, 1924, was 2,067 cars and the best southward record was 2,167 cars on the same day.

One of the Pennsylvania Railroad Hump Crews at Edge Moor, Del.

The illustration, showing one of the Edge Moor switching crews, is from a photograph taken by the Pennsylvania News.

Traffic News

More than 200 shippers and railroad representatives participated in the installation of two additional car floats on the Chicago river by the Erie on August 12. The trip started at the Erie's float bridge at eighteenth street on the south branch of the Chicago river and proceeded to its river freight stations at Webster avenue and Erie street on the north branch, returning to the North Terminal Company's warehouse at the mouth of the river. The Erie's river service was inaugurated in 1915 with two car floats and has now been doubled by the installation of these two additional car floats, costing $100,000. During the first six months of 1924 this service handled 700 cars per month.

F. T. Randall, heretofore traffic manager for Lyon & Healy, makers of musical instruments, Chicago, has been appointed traffic manager of the Central Manufacturing District, Los Angeles, Cal. Mr. Randall has information to the effect that 1,500 pianos—75 carloads—are sold in Los Angeles yearly by a single concern. As all pianos bought in Los Angeles are shipped from Chicago, New York or other eastern points, this statement means a considerable aggregate of ton-miles. He says that from Chicago the carload rate of $2.50 is less than half the rate on smaller lots. However, some New York makers send their pianos through the Panama Canal at $1.00 per 100 lb. Upright pianos, says Mr. Randall, should be shipped unboxed and be screwed to the car floor.

Summer Travel Decreases

Reports from roads operating from Chicago to the Pacific coast and the national parks show that summer travel so far this year has been less than in 1923. The Chicago & North Western has experienced a decrease, except in its special tours to Yellowstone Park, which have shown an increase of about nine per cent. Travel on the Chicago, Rock Island & Pacific to the Pacific coast has fallen off, while travel to Colorado has been approximately the same as last year. The Chicago, Burlington & Quincy has also experienced a decrease in Pacific coast and national park travel. The Chicago, Milwaukee & St. Paul reports that traffic to the Pacific coast at the beginning of the year promised to exceed that of last year but during the summer months fell to less than that of last year but on August 9, an increase in the number of passengers was noted. The reasons attributed for the decrease are the cool weather conditions in the middle west, the territory from which the greater part of this travel is drawn, and automobile competition. The number of automobiles registered as arriving in the national parks this year has been greater than last year.

Freight Traffic for the Half Year

The Bureau of Railway Economics, Washington, has issued a statement showing the freight traffic of the railroads of the country in the first six months of 1924 to have been more than nine per cent below that for the corresponding period in 1923, when freight business was the greatest in history.

Net ton miles amounted to 204,636,000,000 or 20,850,000,000 below the corresponding period last year.

The Eastern District showed 104,353,238,000 net ton miles, a decrease of 12.1 per cent while in the Southern District there was a total of 28,974,620,000 or a decrease of 7.6 per cent. The record in the Western District totaled 71,307,947,000 or 15.9 per cent decrease.

The average daily movement per freight car for the month of June was 25.2 miles, 3.1 miles below the daily average for June, 1923. In view of the fact that the railroads in June had daily an average of nearly 359,000 surplus freight cars and virtually no car shortage, the daily movement per car would naturally be less than in June, 1923, when the daily average of surplus freight cars was approximately 53,850 and the daily car shortage more than 12,000 freight cars.

The average load per freight car in June was 26.7 tons, 1.5 tons below that for the month of June last year.

Commission and Court News

Interstate Commerce Commission

Freight tariffs covering truck or wagon transfer service, when performed as a terminal service of a common carrier subject to the provisions of the Interstate Commerce Act, or in connection with transfer of freight in transit at an intermediate point by the common carrier, have been found by the Interstate Commerce Commission to be not unlawful. Tariffs covering truck services for movements commonly designated as line hauls, when operated as an extension of the line of and as part of a through movement in connection with a carrier subject to the Act, were declared not in accord with Section 6 and the commission's tariff regulations, and must be corrected to comply with directions given by the commission in a report August 13 of its investigation into the legality of such schedules.

The commission has called a conference on September 23 at Washington in its investigation of freight rates in Western and Mountain-Pacific territories to consider divisions on transcontinental traffic. The commission has expressed the hope that the question involved may be settled at the conference and the necessity of a formal procedure avoided. The conference is not for the submission of detailed data, and the commission has suggested that the carriers east and west of the Missouri River and St. Paul send committees of limited size and that, if practicable, they be given power to act.

The commission has announced that it will receive at a hearing in Washington, September 15, further evidence on the question of the compensation of the Missouri-Kansas-Texas reorganization managers and their counsel. The amount of work performed, money expended, the compensation paid for similar service in other railway reorganizations, and the propriety of the standards of compensation for service of that character will be given consideration.

Personnel of Commissions

C. V. Terrell, state treasurer of Texas, has been appointed a member of the Railroad Commission of Texas, succeeding Walter Splawn, who has resigned.

Frank B. Carvell, chairman of the Board of Railway Commissioners of Canada, died suddenly on Saturday, August 9, at his home in Woodstock, New Brunswick, in his sixty-second year. In 1919 Mr. Carvell resigned as federal Minister of Public Works to become chairman of the Railway Commission. The Canadian government is expected to name a successor to Mr. Carvell at once in view of the fact that the commission is preparing to hear, starting September 17, the important case which arises out of the operation of the Crows' Nest Pass agreement, a question of freight rates in which both eastern and western Canada are interested.

State Commissions

The New York State Public Service Commission has denied the application of Gross A. Devoe for a certificate permitting the operation of a bus line between Ossining and Peekskill, 10 miles, on the ground that adequate service is now being furnished by the New York Central. The Central operates 16 trains northbound between the two stations between 6 a. m. and 11:34 p. m., and 14 southbound. The decision says: "There are along the highway small hamlets, some extensive estates, some industrial works and amusement places, which would feel it convenient to have the bus line for service, but I do not think the evidence shows that the line can possibly carry itself or develop a sufficient business so as to be deemed to be within the meaning of the statute a public convenience or necessity. . . . The railroad seems to be giving the public proper service between Ossining and Peekskill and the intermediate stations, and will no doubt increase its service if necessary."

Labor News

Shopmen employed in the main shops of the Canadian National at Montreal, Que., and Stratford, Ontario, have voted in favor of closing down one week in each month rather than to have a number of the men laid off altogether. The other shops of the Central region, in which region the vote was taken, decided against the plan of closing down one week each month, preferring the lay-off system. The decision of the men has been accepted by the management.

Labor Board Decisions

Starting Trains with Excess Tonnage

A decision that there is no rule in the schedule of wages which prohibits starting trains out of an initial terminal with more tonnage than can be hauled by the engine over ruling grades without doubling, was handed down by the Railroad Labor Board in a dispute between the Order of Railway Conductors, the Brotherhood of Railroad Trainmen and the Minneapolis & St. Louis, arising from a protest of the employees against such practice. The labor board sustained the contention of the railway that it has been the practice for many years to give trains more tonnage than could be moved by one engine over the ruling grade without doubling, the employees in such cases receiving additional compensation for doubling, under the provisions of existing agreements.—Decision No. 2562.

Union Officers to Serve Prison Term

Five officers of the Federated Shop Crafts, who were found guilty by the United States District court at El Paso, Tex., of a charge of conspiracy to interfere with interstate commerce during the shopmen's strike in 1922, must serve their prison sentences and pay their fines, according to a decision by the United States Supreme Court upholding the District court. The men, who were convicted of putting quicksilver in Southern Pacific locomotives at El Paso and San Antonio, were each sentenced to 10 months in prison and to pay a fine of $2,500. In spite of the efforts of a large array of defense attorneys, the men were convicted before United States Judge Smith at El Paso in January, 1923. Subsequent appeals to the United States Court of Appeals at New Orleans and to the Supreme Court resulted in affirmations of the decree of the District court.

Reclassifying Station Agents' Positions as Clerical Positions

Reclassification as clerks of the position of station agent at small stations was in violation of the telegraphers' agreement, according to a decision of the labor board in a dispute between the Erie and the Order of Railroad Telegraphers. The labor board directed that the rates in effect prior to the reclassification be restored and the employees be reimbursed for the amount of wage loss sustained. In January, 1922, the Erie consolidated some of its smaller stations, placed two or more of the stations under the supervision of a head agent and established the position of clerk at each of the stations which did not require an agent. The employees claim that this classification of positions was in violation of agreement. The labor board upheld this contention and overruled the argument of the management that the agreement, which was dated October 15, 1919, and had been made with the United States Railroad Administration, terminated at the end of Federal control.—Decision No. 2555.

THE BALTIMORE & OHIO has discontinued the operation of passenger trains between Newark, Ohio, and Shawnee, on the Shawnee branch, and will attach a coach to its local freight train for the accommodation of passengers, mail and express between these points.

Foreign Railway News

Important Construction Project in Spain

Several months ago important railway constructional developments in Spain were forecast briefly in the *Railway Age*. So numerous are the projects that have been laid before the Military Directorate from time to time that a commission was appointed to investigate the merits of the various proposals. This commission has now completed the preparation of its report and has estimated at 1,500 millions of pesetas the work which it considers vitally necessary to be put in hand immediately. At present exchange rates this sum is equivalent to approximately $275,000,000. By far the largest portion of this sum is, as anticipated, divided between the two big trunk lines, the Madrid, Zaragoza & Alicante and the Northern, the former receiving 557,000,000 pesetas and the latter 376,000,000 pesetas.

Apart from the above proposals to be put in hand immediately, it is further proposed to construct during the next twenty years some 7,382 miles of new lines. These will considerably shorten the distance between Madrid, Seville, Gibraltar and Malaga, and also between Madrid and all the ports of the Spanish Northern Litoral, as well as providing a quicker route between Valencia and Madrid. The proposed Paris-Madrid line is not included in these estimates: its enormous importance and the vast amount of capital required for its construction will necessitate either a special law or a royal decree.

While it is improbable that the whole of this huge program will be put in hand at once, the failure of the crops this year will throw upon the Directorate the onus of providing work for a considerable number of men during the forthcoming winter.

Reorganization of German Railways Under the Dawes Plan

Owing to the fact that the "Red Flag," the organ of the German Communist party prematurely published the draft of the bill which will reorganize the German railways in accordance with the terms of the Dawes report, this important information has been made available to the public at a considerably earlier date than anticipated. While there is no reason to suppose that the report would not have been published in due course, the indiscreet announcement of the communist paper has caused great annoyance in Germany, for, although there is nothing particularly secret about the draft as it stands, its publication will cause trouble if additions or alterations take place before it comes before the Reichstag. Briefly, the draft may be outlined as providing for a capital of thirteen billion gold marks' worth of ordinary shares and two billion of preference shares, of which latter one-fourth will be sold, and the capital which they bring in be given to the Reich, and the other three-fourths to the railway company. All ordinary shares will remain in the possession of the government, which is at liberty to hand over a portion to the federal states. Five per cent interest-bearing bonds are to be issued immediately, to the nominal value of eleven billion gold marks, redeemable after the fourth year at 1 per cent. The railway company has in the first year to raise 200, in the second year 595, in the third year 550, and in the fourth year 660 million gold marks, and pay these sums into the Reparations Bank, the government guaranteeing them. Payment may exceed these annual sums if the company is in a position to manage this. The company is administered by a president and a board of directors, the latter consisting of eighteen members, half of whom will be appointed by the government and the other half by the shareholders' trustee. As, however, the government is obliged to hand over four of its seats to holders of the preference shares, it will in reality only possess five or six. The president of the board must be a German holder of part of the preference shares, and both his appointment and that of the board must be approved by the president of the Reichstag.

A railway commissisoner will be appointed by the foreign members of the board. His duties are passive and advisory as long as the railway company fulfills its obligations, but when difficulties arise he becomes active and has the power to raise tariffs and prohibit expenditure. Should the difficulties extend beyond the period of six months the commissioner himself will take over the direction of the railway, or lease it wholly or in part. The company's income will be devoted to paying interest, the redemption of bonds, and the repayment of any other debts eventually incurred, with at least 12 per cent of it retained to form a reserve fund. The remaining sum will be used according to methods not yet provided for in the drafts, such as dividends for the holders of preference shares, and the redemption of these shares. Any remainder after this will be devoted to extra dividends for the shareholders—one-third to the preference and two-thirds to the ordinary shareholders.

From the above brief outline it can readily be seen that the bill can be accepted by the Reichstag without any alteration of the German constitution. The Reich possesses all the ordinary shares, and can even give up part to Bavaria if desired. At present these ordinary shares have only a nominal value, and, as they only yield a dividend when the net profits have been sufficient to redeem the preference shares, ordinary shareholders cannot expect to see as much as one pfennig. In other words, when Germany has paid her reparations debts—and not until then—she regains possession of her own railways.

Both from the political and economic point of view the practical value of putting the commissioner into action as soon as the company defaults, and not before, is immediately apparent. Protests may be expected on the subject of the board of directors, which is so largely composed of foreigners. With three-fourths of the preference share capital in other than German hands, there will be twelve foreign voices to six German, but concessions have been made which may satisfy all but the "die-hards" by providing for a German president of the board, and by leaving the actual technical administration entirely in German hands.

The political factors cannot be ignored. The higher railway official loses caste as servant of an industrial enterprise. Socialist anxiety is audible on the question of railway workmen being no longer free to act according to the dictates of their unions, under this foreign control. Other attitudes are being voiced, including that of the "Rote Fahne" itself, arguing that the 660 million marks which the railways are expected to turn over in normal years represents too large a demand. Yet that figure is actually beneath those suggested by Germany herself.

The optimistic view is that the railways will satisfy their creditors at a far quicker rate than the draft demands. Of course it is dangerous to hazard any guess where such vast sums are in question, but the new railway company known under the name of Deutsche Reichsbahngesellschaft will control the greatest network of railways in one hand in the world, and, being in good condition, will be bound to profit by a unification and centralization of administration which did not exist prior to the war.

State Control of Railway Construction and Operation in Spain

By virtue of a royal decree published on July 13, legislation for the grouping and control of the Spanish railways has been created. The decree's general effect has been to give the government a predominant measure of control in the operation of the railways and in the construction of new lines. A railway board is to be appointed to take a leading part in the administration of the railways, and, while the decree is certainly highly complicated, it would seem that it is intended to make the actual operation of the railways of a semi-government nature through the medium of the Railway Board.

Concerning new rolling stock and plant, as well as new railroad construction, the government would provide the necessary funds, creating for this purpose a "special state railway debt." A very important point to foreign railway interests in Spain is that enterprises which construct or exploit new railways in the future must be nationalized in Spain, and have their head offices there. In addition, the president and at least two-thirds of the other members of the boards of directors and also the principal officers, must be Spanish citizens.

A valuation of the railways is to be carried out within a period not exceeding three years on bases which are specified in the decree, and a provisional valuation is to be made based on the capitalization at 4½ per cent of the average net earnings during the past 15 years The period within which any railway may make application for admittance to the new scheme is three months. British investors have protested against this basis of valuation.

Equipment and Supplies

Locomotives

THE ILLINOIS CENTRAL is reported to be inquiring for 25 heavy Mikado type locomotives. This report has not been officially confirmed.

Freight Cars

THE GREAT NORTHERN is inquiring for 20 oil tank cars.

THE CHICAGO, ROCK ISLAND & PACIFIC, reported in the *Railway Age* of May 24 as inquiring for repairs to 250 refrigerator cars, has ordered 250 refrigerator car bodies from the Pressed Steel Car Company.

THE QUAKER CITY TANK LINE, INC., St. Louis, Mo., has ordered 125, 8,050 gal. capacity tank cars and 75, 10,050 gal. capacity tank cars from the Standard Tank Car Company. The 10,050 gal. capacity cars will be equipped with heater coils.

Passenger Cars

THE INDIANA TRACTION COMPANY has ordered 15 passenger cars from the St. Louis Car Company.

THE INTERBOROUGH RAPID TRANSIT COMPANY, reported in the *Railway Age* of August 2 as about to buy through the Rapid Transit Subway Construction Company 150 subway cars, has issued an inquiry for 150 motor car bodies, 150 motor car trucks and 150 trailers.

Track Specialties

THE NORFOLK & WESTERN is inquiring for 12,000 kegs of spikes.

Signaling

THE CHICAGO & ALTON has ordered from the Hall Switch & Signal Company 65 relays and other material.

THE NEW YORK CENTRAL has ordered from the Hall Switch & Signal Company for installation on the West Shore between Lyons, N. Y., and Churchville, 175 color-light signals with 785 relays, 323 switch boxes and other material; also for installation on the Mohawk division and elsewhere, 5 color-light signals, 77 relays, electric locks and other material for installation in signal towers.

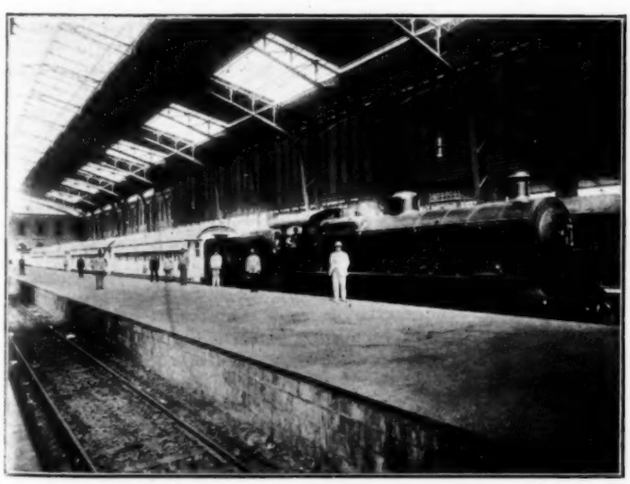


Photo by A. Reid, Cairo

Passenger Station at Cairo, Egypt

Supply Trade News

The Southern Wheel Company, St. Louis, Mo., will enlarge its branch plant at Nevada, Ga.

George C. Billman has been elected president of the **Charles C. Young Manufacturing Company,** Jersey Shore, Pa.

The Inland Steel Company has opened a branch office in the Bank of Commerce building, Kansas City, Mo., and **O. G. Blake** has been made district sales manager.

F. A. Keihn, formerly of the engineering department of the International Motor Company, has been appointed sales engineer, automotive car division, of the **J. G. Brill Company.**

David E. Drake, of the sales department of the **Westinghouse Electric & Manufacturing Company,** has retired at the age of 76 after a career of 50 years in the electrical industry, 34 of which were spent in the service of the Westinghouse Company.

The American Locomotive Company has awarded a contract to the **Chicago Bridge & Iron Works** for the furnishing and erecting of a 50,000-gal. tank on a 100 ft. tower at its Richmond, Va., plant. The tank will be used for the purpose of affording fire protection.

The Transportation Devices Corporation, Indianapolis, Ind., manufacturers of automatic cut-off control for locomotives, has appointed the **Lyman Tube & Supply Company, Ltd.,** Montreal, as its Canadian representative. This company has branch office in Toronto and Vancouver.

G. L. Wilder, railway specialist for the **International General Electric Company,** is spending several months in Cuba and Mexico co-operating with the General Electric Company of Cuba and the Mexican General Electric Company in expanding their facilities for service to steam and electric railways and public utilities, and also in promoting steam and electric railway sales.

U. S. Sales of Railway Equipment to Foreign Countries Decline

The rehabilitation and aggressive re-entry of Western European railway equipment manufacturers into world markets is the principal cause for the $10,000,000 slump in values of American shipments of rolling stock, locomotives, air brake equipment and parts for the year ending June 30, 1924, in the opinion of the Transportation Division of the Department of Commerce. The prospects during the current fiscal year are much brighter, however, with every promise for recovery. New railroads are being constructed in Latin America, while old lines are adding to their equipment.

For the fiscal year ended June 30, 1924, 279 locomotives, valued at $4,188,236, were exported as compared with 276, valued at $5,307,075, in 1923. The earthquake in Japan was undoubtedly responsible for the largest single increase in locomotives exports, for 10 locomotives, valued at $83,672 in 1923, advanced to 33 locomotives, valued at $220,846 in 1924. The generally improved condition of the Mexican railways, particularly those of the National Railway System, was responsible for an increase of from 10 locomotives, valued at $120,728 in 1923, to 21 locomotives, valued at $154,416 in 1924. The outstanding sale of 1923, 28 locomotives, valued at $703,725, to the Polish Government was not of course expected to be repeated in 1924, and consequently this sum is the largest loss in exports to any particular country.

Electrical locomotives exported increased from 48, valued at $2,758,191 in 1922-1923, to 74, valued at $1,955,646 during the last fiscal year.

The export of freight cars during the past fiscal year showed a decline of 6,760 cars with a value of $8,298,085 from the corresponding figures of 1922-1923, which disclosed shipments

of 10,453 cars, valued at $11,729,962, as compared with 3,693 cars worth $3,431,877 in 1923-1924. Chile and Cuba are the only countries to show an increase in purchases from us, advances being 307 cars worth $409,590 and 67 cars valued at $147,711.

Notable decreases were recorded in sales of American manufacturers to Poland and Danzig, Germany, Mexico, with lesser ones distributed among other countries.

Electric passenger cars exported during the past fiscal year increased from 84 cars valued at $357,482 in 1923 to 89 cars, valued at $683,491, while steam passenger cars decreased from 149 cars valued at $2,561,655 in 1922-1923, to 140 cars valued at $944,608 in 1923-1924.

More than 100 per cent increase was shown in the export of mine cars during the last fiscal year as compared with 1922-1923, comparative figures being 3,143 cars, valued at $697,306, as compared with 1,410 cars valued at $247,990.

Miscellaneous exports of parts of cars (including car wheels and axles) increased from 78,938,308 pounds valued at $5,753,436 in 1922-1923, to 84,388,215 pounds valued at $6,221,427 during the last fiscal year.

The value of air brake equipment increased from $284,941 in 1922-1923 to $1,072,596 during the last fiscal year.

July Shipments of Locomotives

The Department of Commerce has announced the July shipments of locomotives from the principal manufacturing plants, based on reports received from the individual establishments. The figures are given in the following table:

LOCOMOTIVES

	Shipments			Unfilled orders		
Year and month	Total	Domestic	Foreign	Total	Domestic	Foreign
1923						
January	229	217	12	1,788	1,699	89
February	207	196	11	2,220	2,141	79
March	282	269	13	2,316	2,214	102
April	217	201	16	2,204	2,111	93
May	238	228	10	2,150	2,045	105
June	232	221	11	1,958	1,854	104
July	239	211	28	1,738	1,652	86
August	272	259	13	1,497	1,406	91
September	335	313	22	1,178	1,102	76
October	310	295	15	977	915	62
November	299	270	29	691	656	35
December	329	305	24	387	365	22
1924						
January	151	147	4	376	344	32
February	99	92	7	499	466	33
March	132	128	4	534	494	40
April	73	63	10	640	586	54
May	111	93	18	643	589	54
June	145	134	11	531	462	69
July	140	130	10	483	416	67

National Railway Appliances Association to Have More Space

The National Railway Appliances Association has arranged with the Coliseum Company, Chicago, for additional space 105 ft. by 172 ft. in area immediately north of the present building for its exhibit next March. The Coliseum Company will build a new structure on this property with spacious doorways connecting with the main exhibit hall, which will add approximately 18,000 sq. ft. of floor space for exhibition purposes. This space will tend to relieve much of the congestion which has prevailed in recent years and will enable the association to more nearly meet all of the demands for space. Floor plans and other information pertaining to the exhibit are being mailed to exhibiting members of the association, and space will be assigned at a meeting of the board of directors in November.

Obituary

D. A. Tomlinson, manager of the Railways bureau of the Portland Cement Association, with headquarters at Chicago, died on August 7, while playing tennis. He was born on April 17, 1890, at Detroit, Mich., and graduated from the Massachusetts Institute of Technology in 1912. He later took up special work at Armour Institute, Chicago. He entered railway service in June, 1912, with the Chicago & Western Indiana, in whose employ he remained for five years, during which he was assistant engineer, handling successively track elevation, yard construction, valuation and extensive studies of terminal facilities. He entered the United States Army in June, 1917, as a second lieutenant and was discharged in January, 1919, as a captain in the coast artillery corps. During his period of service he was adjutant to the constructing quartermaster at Camp Grant and instructor of orientation at the Officers Training camp and at the Coast Artillery School at Fort Monroe, Va. At the conclusion of the war he was appointed manager of the Central Zone Professional and Special section of the United States Employment Service, Chicago, an organization of facilities for obtaining employment for returning soldiers and sailors, especially in the engineering field. From April, 1919, to February, 1920, he was assistant secretary of the American Association of Engineers at Chicago in charge of railroad and employment work. He entered the employ of the Portland Cement Association at Chicago in February, 1920, and in January, 1922, he was promoted to manager of the Railways bureau, which position he held until the time of his death.

Edmund F. Boyle, Pacific coast representative of a number of railway supply companies, with office in San Francisco, Cal., died on July 14, in Los Angeles, Cal. Mr. Boyle went to San Francisco about four years ago as the representative of the following concerns in the Pacific coast territory: Ashton Valve Company; Pilot Packing Company; Locomotive Firebox Company; Nathan Manufacturing Company; Premier Staybolt Company; Grip Nut Company; Magnus Company, Inc.; Heywood-Wakefield Company; Bradford Corporation; Union Metal Railway Equipment Company; Standard Railway Equipment Company; Cincinnati Rivet Cutting Gun Company and the Oxweld Service Company. Mr. Boyle was born on January 5, 1875, and entered the service of the Chicago & North Western in 1889 as water boy and was subsequently in the service of the bridge and building department of that road until 1890. In 1891 he entered the service of the Chicago, St. Paul, Minneapolis & Omaha and shortly thereafter became a fireman. He then served as engine dispatcher and in 1895 was promoted to engineman. In 1899 he entered the service of the Galveston, Harrisburg & San Antonio in the same capacity and was appointed assistant superintendent in 1913. He was appointed general road foreman in 1914 and entered the service of the Southern Pacific as an engineman shortly thereafter, from which position he resigned in 1920 to enter the railway supply field.

E. F. Boyle

Trade Publications

CREOSOTED YELLOW PINE POLES.—The International Creosoting & Construction Company, Galveston, Tex., has issued a 36-page, handsomely illustrated booklet describing its pressure creosoted Southern yellow pine poles. This book contains a detailed, accurate, technical presentation of the merits of Southern yellow pine as a pole wood and of creosote as a preservative; describes the location and methods of production of these poles, the precautions taken in seasoning and treating them and the measures taken to insure their thorough impregnation with creosote of the proper quality to warrant the company in placing its dating nail in each pole that leaves its plant. The book is profusely illustrated with excellent illustrations of each step entering into the production of the finished pole. It concludes with considerable tabular information regarding the volume and strength of poles and specifications for poles and for their treatment. It should form a valuable reference booklet for users of poles.

Railway Construction

CANADIAN PACIFIC.—This company has awarded a contract to Stewart & Cameron, Winnipeg, Man., for the grading of a branch line from Amulet, Sask., to Dunkirk, a distance of 35 miles. This company has awarded a contract to W. A. Dutton, Winnipeg, for the grading of an extension from Consul, Sask., into the Frenchman River district.

CHICAGO, ROCK ISLAND & PACIFIC.—This company is receiving bids for the construction of extensions to the stalls of its roundhouse at Cedar Rapids, Iowa.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has awarded a contract to the Walsh Construction Company, Chicago, for the construction of an addition to its roundhouse at Sharonville, Ohio.

ERIE.—This company has awarded a contract to the Chicago Bridge & Iron Works for the furnishing and erection of a conical bottom steel tank of 50,000 gal. capacity at Johnsons, Ohio.

ERIE.—This company will receive bids until August 18 for the installation of coal handling machinery for its new power house at Jersey City, N. J., and for the erection of a new passenger station at Englewood, N. J.

ILLINOIS CENTRAL.—This company will soon call for new bids for the construction of the line from Edgewood, Ill., to Fulton, Ky., a distance of 169 miles.

ILLINOIS CENTRAL.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a concrete viaduct incident to grade separation work at North Baton Rouge, La., to cost $75,000.

KANSAS CITY SOUTHERN.—This company is reported to be planning the construction of a station at Port Neches, Tex.

MISSOURI PACIFIC.—This company has awarded a contract to the T. S. Leake Construction Company, Chicago, for the construction of a machine shop at Fort Scott, Kan.

NORTHERN PACIFIC.—This company is constructing a 144-ft. by 190-ft. brick boiler and tank shop with 1, 70-ton and 1, 15-ton traveling crane at Livingston, Mont.

PENNSYLVANIA.—This company has awarded a contract to Sinclair & Grigg, Philadelphia, for the erection of retaining walls and bridge abutments for track elevation between Arsenal bridge and Twenty-fifth and Reed streets, Philadelphia, to cost approximately $250,000.

ST. LOUIS-SAN FRANCISCO.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the installation of power lines at its Lindenwood shop at St. Louis, Mo., to cost approximately $25,000.

SOUTHERN.—This company has awarded a contract to the Foundation Company for the design and construction of new locomotive repair shops at Atlanta, Georgia. The main building will be a double transverse erecting and machine shop for locomotives, about 325 ft. long and over 300 ft. wide. It will be of steel construction with brick walls, and will provide facilities for two 200-ton electric traveling cranes and several smaller cranes, some of which will be located inside the building and others in the yard. The new shops will require additional boiler capacity in the power plant, which work is included in the contract. Designs are being prepared by the Foundation Company collaborating with the railroad company's engineers. Construction will be started in about three weeks. It is estimated that it will take six months to finish the contract, and the total cost will be over $750,000.

TEXAS & PACIFIC.—This company is reported planning the construction of a freight and passenger station at Natchitoches, La.

TEXAS & PACIFIC.—This company plans the construction of an enginehouse, repair shop and sheds at Dallas, Texas. Plans for this project were completed early this year as reported in the *Railway Age* of January 5.

Railway Financial News

ANTHONY & NORTHERN.—*Tentative Valuation.*—The Interstate Commerce Commission has served a tentative valuation report as of June 30, 1919, placing the final value for rate-making purposes of the property owned at $960,300 and that of the property used at $961,700. The outstanding capitalization as of valuation date was $1,917,000 and the book investment in road and equipment was $2,505,336, which the report readjusts to $2,209,236. The cost of reproduction new of the used property is reported as $1,026,845 and the cost of reproduction less depreciation as $856,772.

BALTIMORE & OHIO.—$75,000,000 *Bonds.*—Kuhn, Loeb & Co., Speyer & Co. and the National City Company are offering, subject to the approval of the Interstate Commerce Commission, $75,000,000 Baltimore & Ohio first mortgage 5 per cent gold bonds, due July 1, 1948, at 98½ and accrued interest, to yield more than 5.10 per cent. The proceeds of this issue will be used to retire $75,000,000 of prior lien 3½ per cent bonds due July 1, 1925.

Preference in allotment to be determined in each case by the syndicate managers is to be given to subscribers who agree at the time of subscription to make payment in maturing prior lien 3½ per cent bonds taken at par and interest.

As the terms of the first mortgage provide for only 4 per cent interest, a supplemental indenture will be executed for the additional 1 per cent interest, under which the company will agree that, in event that it should hereafter place any new mortgage on the property securing these bonds, the additional 1 per cent interest which these bonds bear is to be secured by a lien prior to any bonds issued under such new mortgage. These bonds are the remaining bonds reserved under the first mortgage, so that the first mortgage will now become a closed mortgage.

The new bonds will not be subject to redemption before April 1, 1945, on which date and thereafter they may be repurchased by the company, upon payment of a premium of ¼ per cent for each three months from the date of repurchase to the date of maturity.

BUFFALO, ROCHESTER & PITTSBURGH.—*Abandonment of Branch.*—This company has asked permission from the Interstate Commerce Commission to abandon a portion of its Eleanora branch, extending from Eleanora Junction to Big Run, Jefferson county, Pa., a distance of one mile. The line will make place for a state highway project.

CANADIAN NATIONAL RAILWAYS.—*New Director.*—R. H. McKay, of New Glasgow, N. S., has been appointed a director in place of J. H. Sinclair, deceased.

CAIRO, TRUMAN & SOUTHERN.—*Tentative Valuation.*—The Interstate Commerce Commission has served a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned at $134,292 and of the property used at $176,796. The outstanding capitalization as of valuation date was $100,000 and the book investment in road and equipment was $108,796. The cost of reproduction new of the used property is reported as $192,949 and the cost of reproduction less depreciation as $156,557.

CASTLEMAN VALLEY.—*Stock.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than par of $50, common stock to the amount of $70,000 and $230,000 of 7 per cent cumulative preferred stock of the same par value, the proceeds to be used for the purchase and rehabilitation of the property.

CHICAGO, ROCK ISLAND & PACIFIC.—*Notes.*—Speyer & Co. and Dillon, Read & Co. are offering at 99, to yield 5.25 per cent, $5,000,000 five-year 5 per cent secured gold notes, due September 1, 1929. The notes are to be secured by pledge of $7,500,000 first and refunding mortgage 4 per cent gold bonds, with a 20 per cent margin to be maintained. Proceeds are to be used for additions and betterments and other corporate purposes.

COLORADO & SOUTHERN.—*Abandonment.*—As the U. S. district court in Colorado was unable to hear the petition of that state to set aside the certificate of the Interstate Commerce Commission, authorizing abandonment of the Chaffee County branch of the Colorado & Southern, prior to August 11, its effective date, the commission has postponed the effective date until September 24. The issue involved is the jurisdiction of the commission. In the

Texas v. Eastern Texas case the Supreme Court held that the commission has authority to permit abandonment of an intrastate line only in interstate and foreign commerce unless its continued operation constitutes a burden on interstate commerce. That is the position taken by the commission in the present instance. The line extends from Buena Vista to Romley, Colo., a distance of 29 miles and serves a metal mining region. It has been operated at a large loss for several years. In the language of the commission:

"The applicant's lines are not located and doing business wholly within the state of Colorado. The applicant is an interstate carrier, the operating results of the branch line are reflected in its accounts, and it is required to bear or make good the deficits from such operation. It clearly appears that, in the language of the Supreme Court, the large losses sustained in operating the branch line 'would or might burden or cripple the main line and thereby effect its utility or service as an artery of interstate and foreign commerce.' We are of the opinion that we have jurisdiction."

FEDERAL VALLEY.—*Tentative Valuation.*—The Interstate Commerce Commission has served a tentative valuation report as of December 31, 1922, placing the final value for rate-making purposes of the property wholly owned and used at $392,240. The outstanding capitalization as of valuation date was $474,803 and the book investment in road and equipment was $474,253. The cost of reproduction new of all the common carrier property is reported as $473,557 and the cost of reproduction less depreciation as $382,314.

INTERNATIONAL-GREAT NORTHERN.—*Securities.*—This company has been authorized by the Interstate Commerce Commission to issue $2,400,000 of 6 per cent secured gold notes and to pledge $2,750,000 of first mortgage gold bonds, series A, as security.

The International-Great Northern has been authorized, also, to pledge $600,000 of first mortgage 30-year 6 per cent gold bonds, in connection with the giving of a supersedeas bond, or with the Texas Company direct in lieu of such bond.

New Directors.—G. H. Walker and George E. Warren of New York, and J. S. Pyeatt and Frank Andrews, of Houston, Tex., have been elected directors of the International-Great Northern; and G. H. Walker and George E. Warren have been elected members of the executive committee. Mr. Walker has been elected chairman of the board and chairman of the executive committee.

KANSAS CITY, KAW VALLEY & WESTERN.—*Receivership.*—Harry C. Jobes was appointed receiver on July 19, 1924. The company operates between Kansas City, Mo., and Lawrence, Kan., 35 miles.

A protective committee has been formed to protect the interests of the holders of the first mortgage 6 per cent 10-year bonds, which became due August 1. Thomas F. Mawer, 317 Cuyahoga Building, Cleveland, Ohio, is secretary of the committee.

LASALLE & BUREAU COUNTY.—*Compensation.*—A board of referees appointed by the Interstate Commerce Commission has found this carrier entitled to $2,098 as just compensation for the failure of the Director General to return its property in as good condition as at the beginning of federal control. The award is in addition to that payable to the company for the use of its property.

LEHIGH VALLEY.—*Bonds.*—This company has been authorized by the Interstate Commerce Commission to sell $12,000,000 of general consolidated mortgage 5 per cent bonds at not less than 96.5 per cent of par to Drexel & Co., of Philadelphia, and the First National Bank of New York, the proceeds to be used for redemption of $15,000,000 of 10-year 6 per cent collateral trust bonds.

LORAIN, ASHLAND & SOUTHERN.—*Guaranty.*—The Interstate Commerce Commission has certified to the Treasury that $261,938 is the amount to which this company is entitled as guaranty for the first six months following federal control.

MAINE CENTRAL.—*Stock.*—This company has requested authority from the Interstate Commerce Commission to issue $600,000 of preferred stock, consisting of 6,000 shares to be distributed as a dividend among preferred stockholders on the basis of one share of new stock at par for each five shares held. The last dividend on the company's preferred stock was paid September 1, 1920. The amount of accumulated preferred dividends September 1 next will be $600,000, or $20 per share on 30,000 shares. The company proposes to issue the new stock to meet this obligation. The new stock will have no voting power and will carry cumulative dividends at the rate of 5 per cent.

MORGAN'S LOUISIANA & TEXAS.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Franklin & Abbeville Railway by purchase of its entire outstanding capital stock and bonds for $379,000. The Franklin line is 46 miles in length, its principal termini are at Sterling and Milton, La., and its points of interchange with the Morgan line are Baldwin, New Iberia and Sterling Wye, La.

NEW YORK, CHICAGO & ST. LOUIS.—*Merger.*—Rumors to the effect that the Erie and the Pere Marquette were about to be acquired by the Van Sweringen interests came to a head on August 7 in a semi-official statement purporting to have come from interests closely affiliated with the Van Sweringens confirming the truth of the rumors. The statement said:

From sources in a position to know the general terms of the plan of consolidation of the roads proposed to be combined with the New York, Chicago, & St. Louis, it is understood that a new company will be formed to take over the five companies to be made the subject of a consolidated "Nickel Plate" corporation, control to be exercised both through an exchange of stock and through a lease of the physical properties. The terms of exchange of stock, it is understood, have been agreed to by the larger stockholders of each of the properties, and, following action by the various boards to be called to voice their approval of terms, a formal offer will be mailed to the stockholders some time this month.

E. N. Brown is absent on vacation, but he has been asked to return to take charge of the Pere Marquette end of the business.

The new Nickel Plate Company will have two classes of stock: A 6 per cent cumulative preferred stock and a common stock which it is understood will be put on a 6 per cent dividend basis from the time of issuance, as the 1923 earnings applicable to such common stock based on a consolidation of the five income accounts, show close to $14 a share earned for 1923.

In addition to the special situation of the Chesapeake & Ohio, because of its existing ownership of close to 90 per cent of the Hocking Valley, there is also a special situation in the case of the present New York, Chicago & St. Louis, which owns over 150,000 shares of Chesapeake & Ohio, and considerably over 100,000 shares of Pere Marquette, which stock will be exchanged in accordance with terms of the plan and will remain an asset of the present New York, Chicago & St. Louis Railroad. Stock to be given to the latter company in exchange for its physical assets will be additional to that which it receives in its present capacity of a holding company of these shares.

THE TERMS AS REGARDS STOCK

General terms to be offered to present stockholders are understood to be as follows: For Erie first and second preferred stocks, 50 per cent in preferred stock of the new company; for Erie common stock, 40 per cent in new common stock.

For Pere Marquette prior preferences stock, 100 per cent in new preferred stock, bearing 6 per cent dividends against the existing 5 per cent; for Pere Marquette preferred stock, 90 per cent in new preferred stock, thereby giving these stockholders 5.40 per cent return, as against present 5 per cent dividends; for Pere Marquette common stock 85 per cent in new common stock.

For Chesapeake & Ohio 6½ per cent preferred stock, 115 per cent in new 6 per cent preferred stock, giving these stockholders 6.9 per cent return, as against the existing limit of 6.5 per cent; for Chesapeake & Ohio common stock, 55 per cent in new 6 per cent preferred stock and 55 per cent in new common stock, these stockholders thereby receiving, based on six dividends on the new common stock, 6.6 per cent a year, as against the existing 4 per cent; for Hocking Valley common stock, 50 per cent in new 6 per cent preferred stock and 50 per cent in new common stock, thereby giving the stockholders 6 per cent a year, instead of 4 per cent as at present.

As to the existing New York, Chicago & St. Louis Railroad, the plan proposes that because of its existing interest in the other shares mentioned above the New York, Chicago & St. Louis shall continue as a holding company, having disposed of its fixed property to the new company and retaining in its treasury the shares of stock issuable against such fixed property, together with the shares of stock applicable to its existing holdings of Chesapeake & Ohio and Pere Marquette, as set forth above.

The New York, Chicago & St. Louis is to receive for its physical property an amount of new preferred stock of a par value equivalent to the existing New York, Chicago & St. Louis preferred stock and an amount of common stock equivalent to the existing common stock. Such preferred and common stocks, together with the preferred and common stocks issued against its ownership of Chesapeake & Ohio and Pere Marquette, are to be held for the benefit of the existing preferred stock and common stock of the New York, Chicago & St. Louis Railroad Company. So far as regards the stock of the five companies, other than the present New York, Chicago & St. Louis Railroad Company itself, it is probable that actual deposit of stock will be requested pursuant to the terms of the plan to be mailed to the stockholders. Whether or not an actual exchange of the stock of the present New York, Chicago & St. Louis will be made has apparently not yet been determined.

PLAN CALLED ESSENTIALLY SOUND

Students of railroad consolidation who have been consulted regarding the proposed plan are of the opinion that the proposed consolidation will be essentially sound both from the standpoint of traffic and from that of the consolidated financial structure. Pere Marquette furnishes a considerable amount of local traffic and will act as a medium of distribution of the large amounts of coal which move northward from the mines along the Chesapeake & Ohio. The New York, Chicago & St. Louis itself has a fast freight line which is in a position to handle eastbound traffic expeditiously, delivering it to the Erie for shipment to New York over a line that has the lowest grade of any of the lines between the Buffalo-Pittsburgh gateway and tidewater. On the other hand, the lines of the Erie west of Buffalo are better suited

to traffic moving west and will handle part of the heavy coal tonnage which moves up from the Chesapeake & Ohio at the Ohio River, the Hocking Valley constituting a physical connection between the Chesapeake & Ohio and the Erie and Nickel Plate mileage.

From a financial standpoint it is understood that the new Nickel Plate company, based on 1923 earnings, will have shown its fixed charges earned nearly twice, its preferred dividends over 3¾ times and its common dividends at the rate of 6 per cent well over twice. Finally, the proposed consolidation is the first comprehensive one to be undertaken since the passage of the Transportation act and follows a similar constructive effort on the part of the Van Sweringens in consolidating into the present New York, Chicago & St. Louis Railroad Company the former New York, Chicago & St. Louis, the Toledo, St. Louis & Western and the Lake Erie & Western companies, with which consolidation the Van Sweringens have been singularly successful.

The Van Sweringens are reported to be after the Wheeling & Lake Erie, the Virginian and the Delaware, Lackawanna & Western.

PEORIA & PEKIN UNION.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to create a new first mortgage for the purpose of converting all existing secured indebtedness into a long-term obligation carrying a lower rate of interest. That rate will be 5½ per cent. The mortgage limits the amount of bonds to be issued thereunder to $6,000,000 of which the company proposes to issue immediately $3,200,000 to retire a government loan of $1,797,000, $376,000 of outstanding first mortgage bonds, $821,000 of second mortgage bonds and $5,000 of underlying issues and to reimburse its treasury in part on account of improvements to June 30 last to the extent of $201,000 not heretofore capitalized. The bonds have been sold by Taylor, Ewart & Co. and associates at par and interest to yield 5.50 per cent.

SEABOARD.—*Acquisition.*—This company has been authorized by the Interstate Commerce Commission to acquire control by lease and purchase of capital stock of the Florida Western & Northern Railroad. The latter has been authorized to construct its projected lines in Florida and to finance construction has been given authority to issue $5,000 of common stock consisting of 50 shares at $100 par, to be sold at par for cash, and $7,000,000 of first mortgage sinking fund 7 per cent gold bonds, series A, to be sold at not less than 92½. The Seaboard has been granted authority to assume obligation and liability for the securities of the Florida Western & Northern and also of the Land Company of Florida, formerly the Florida Land & Development Company.

Dividends Declared

Canadian Pacific.—Common, 2½ per cent, quarterly; preferred, 2 per cent, semi-annually; both payable October 1 to holders of record September 2.

Cripple Creek Central.—Preferred, 1 per cent, payable September 1 to holders of record August 15.

New Orleans, Texas & Mexico.—1¾ per cent, quarterly, payable September 1 to holders of record August 22.

Pittsburgh, Youngstown & Ashtabula.—Preferred, $1.75, quarterly, payable September 2 to holders of record August 20.

Trend of Railway Stock and Bond Prices

	Aug. 12	Last Week	Last Year
Average price of 20 representative railway stocks	71.75	71.16	58.68
Average price of 20 representative railway bonds	88.69	88.73	82.49

THE LOUISVILLE & NASHVILLE, during the first six months of 1924, has reduced the number of freight claim payments filed and paid by 33 per cent as compared with the same period of 1920. The results have been brought about by an intensive campaign among employees and shippers. During 1919 and 1920 loss and damage claim payments amounted to almost 2.5 per cent of the gross freight revenues while in 1923 and for the first half of 1924 they amounted to less than one per cent.

OVER A MILLION DOLLARS in supplementary compensation was paid on August 4 by the General Electric Company to those of its employees who have been with the company continually for five years or more. The bonus payments are for the six months ended June 30 last, and amount to 5 per cent of the earnings of the employees during that period. A total of 27,412 employees shared in this distribution, which was paid largely in bonds of the G-E Employees' Securities Corporation. The total amount paid was approximately $1,172,000.

Railway Officers

Executive

Harry C. Jobes has been appointed receiver of the Kansas City, Kaw Valley & Western, with headquarters at Kansas City, Kan.

Traffic

Irving N. Doe has been appointed general agent of the Boston & Maine at Cleveland, Ohio. This is a new freight and passenger agency, office in the Park building.

W. M. Biggerstaff, traveling freight agent for the Erie, with headquarters at Buffalo, N. Y., has been promoted to commercial agent, with headquarters at San Francisco, Cal.

A. E. Buchanan, whose promotion to assistant general passenger agent of the Pennsylvania, with headquarters at Philadelphia, Pa., was announced in the *Railway Age* of August 9, was born on September 30, 1871, at Philadelphia and completed his education at the Philadelphia Manual Training School in 1888. He entered the service of the Pennsylvania in March, 1890, as a stenographer in the passenger department and later served in various branches of the passenger traffic department. Mr. Buchanan was then placed in charge of the company's Tourist Bureau and was later promoted to chief clerk to the general passenger agent. In 1907 he was appointed chief clerk of the passenger department and on October 1, 1908, he was promoted to division ticket agent of the Eastern Pennsylvania division. At the reorganization of the passenger department, on March 1, 1913, Mr. Buchanan was promoted to division passenger agent at Harrisburg, Pa., and on October 1, 1917, he was appointed division passenger agent at Baltimore, Md. On November 1, 1920, he was transferred to Philadelphia, in the same capacity, the position he held at the time of his recent promotion to assistant general passenger agent.

A. E. Buchanan

Operating

I. L. Boomer, chief dispatcher on the Port Arthur division of the Canadian National, has been promoted to assistant superintendent, with headquarters at Rainy river, Ont., succeeding J. H. McDiarmid, who has been transferred.

H. O. Kelley, division engineer of the Peru division of the Wabash, with headquarters at Peru, Ind., had been appointed general manager of the Toledo & Western, with headquarters at Sylvania, Ohio, succeeding A. Swartz, who has resigned to engage in other business.

Ernest Thwaites, superintendent of the Cleveland division of the New York Central, with headquarters at Cleveland, Ohio, has been promoted to general superintendent of the Third district, with the same headquarters. He will be succeeded by **C. M. Williams**, division superintendent, with headquarters at Toledo, Ohio.

N. L. Howard, superintendent of transportation of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been appointed general manager of the Chicago Union Station Company. Mr. Howard was born on March 9, 1884, at Fairfield, Iowa, and graduated from the United States Military Academy at West Point, N. Y., in 1907. He entered railway service in September of that year as a civil engineer on the Chicago, Burlington & Quincy and later was successively promoted to trainmaster, assistant superintendent and superintendent of the Burlington division. Mr. Howard was transferred to the Hannibal division in 1916. He left railway service in May of the following year to enter the United States Army as a lieutenant-colonel of the Thirteenth Railway Engineers. In August, 1917, he was assigned to the staff of the director general of transportation in France, and in 1918 was placed in command of the Thirteenth Railway Engineers, with the rank of colonel. Mr. Howard returned to railway service in May, 1919, as assistant to the federal manager of the Chicago, Burlington & Quincy. He was promoted to general superintendent of the Missouri district in November, 1919, and held this position until July, 1923, when he was appointed superintendent of transportation, with headquarters at Chicago. He remained in this position until his recent appointment as general manager of the Chicago Union Station Company.

Purchasing and Stores

F. G. Prest, whose retirement as director of purchases of the Northern Pacific, with headquarters at St. Paul, Minn., was reported in the *Railway Age* of August 2, was born on January 5, 1854, at Queenston, Ont. He entered railway service in 1880 as a clerk in the purchasing department of the Northern Pacific at St. Paul, and held that position until 1882 when he was promoted to chief clerk in the same department. Mr. Prest was promoted to assistant purchasing agent, with headquarters at St. Paul, in 1891 and in 1896, was promoted to purchasing agent, with the same headquarters. He was promoted to director of purchases, with the same headquarters, in November, 1921, and continued in that capacity until his recent retirement. Mr. Prest's entire railway service of 44 years was with the Northern Pacific.

F. G. Prest

Engineering, Maintenance of Way and Signaling

C. S. Robinson, whose promotion to engineer maintenance of way of the Maine Central, with headquarters at Portland, Me., was announced in the *Railway Age* of July 19, was born at Portland, Me., on April 10, 1887, and received his engineering education at the University of Maine. He entered railway service with the Maine Central in 1909 as a rodman and except for a short period during the war, remained continuously in the service of that road. During his railway service he was subsequently promoted to instrument-man, assistant engineer, chief clerk and general supervisor maintenance of way, the position he held at the time of his promotion to engineer maintenance of way.

J. T. Vitt, division engineer of the Western division of the Wabash, with headquarters at Moberly, Mo., has been transferred to the Peru division, with headquarters at Peru, Ind., to succeed **H. O. Kelly,** who has been appointed general manager of the Toledo & Western, as noted elsewhere in this issue. **H. N. Huntsman,** division engineer of the St. Louis Terminal division, with headquarters at St. Louis, Mo., has been transferred to Moberly, Mo., to succeed Mr. Vitt. **F. C. Huntsman,** first assistant engineer of the Moberly division, with headquarters at Moberly, Mo., has been promoted to division engineer of the St. Louis Terminal division, with headquarters at St. Louis, Mo., succeeding H. N. Huntsman in this position.

C. B. Hoyt, superintendent of track, maintenance and construction of the Nickel Plate district of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has retired on account of ill health and the office has been abolished. **F. S. Hales** has been appointed engineer of track, with headquarters at Cleveland, Ohio, a newly created position. Mr. Hoyt was born on February 12, 1860, at Adrian, Mich., and entered railway service in 1888 as a roadmaster's clerk on the Lake Shore & Michigan Southern, now a part of the New York Central. In 1893 he was promoted to roadmaster of the Ft. Wayne division and he was later transferred to the Coldwater division. Mr. Hoyt was appointed chief supervisor of track of the New York, Chicago & St. Louis in August, 1898, and held this position until October, 1905, when he was promoted to trainmaster of the Western division. He was promoted to superintendent of track, maintenance and construction in August, 1907, and remained in that position until his retirement.

Obituary

James W. Davis, auditor of the Missouri Pacific until his retirement which became effective in the year 1909, died on August 4.

G. W. Smith, district passenger agent of the Missouri-Kansas-Texas, with headquarters at Pittsburgh, Pa., died in that city on August 7.

E. Ford, assistant to the president of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with headquarters at New Orleans, La., died at his home in that city on August 13.

Edmund T. Burnett, who retired as general purchasing agent of the Norfolk & Western on December 31, 1920, at Roanoke, Va., died at a hotel in New York on July 14 following a short illness. Mr. Burnett was born at Philadelphia, Pa., on December 10, 1843, and entered the service of the Norfolk & Western on April 10, 1882, as chief clerk to the purchasing agent, with headquarters at Philadelphia. He was appointed assistant to the purchasing agent on January 1, 1891, with headquarters at Roanoke and in May, 1893, he was appointed purchasing agent, with headquarters at Philadelphia. In 1896 he was transferred back to Roanoke. At the beginning of the period of federal control Mr. Burnett was appointed regional purchasing agent of the Pocahontas region, with headquarters at Roanoke and at the termination of federal control he was appointed general purchasing agent of the Norfolk & Western, in which capacity he served up to the time of his retirement in 1920.

Alvin E. Deal, bridge engineer of the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J., died on July 24. Mr. Deal was born at Green Island, N. Y., on December 24, 1860, and was graduated from Rensselaer Polytechnic Institute at Troy, N. Y., in 1882. From 1882 to 1885 he was engaged in various activities connected with bridge construction in the vicinity of Pittsburgh, Pa., entering railway service in September of the latter year as an assistant engineer on the Delaware, Lackawanna & Western at Scranton, Pa., where he remained for the next four years. In October, 1889, he was promoted to assistant bridge engineer, with headquarters at Hoboken, N. J., serving in that capacity until February, 1903, when he was promoted to bridge engineer, with the same headquarters. Mr. Deal continued in the capacity of bridge engineer up to the time of his death, his entire railway service having been with the Delaware, Lackawanna & Western.